10263

The Manufacturing and Construction Journal of the Textile Industry

COTTON

Entered as second-class matter at the postoffice, Dalton, Ga., under the Act of March 3, 1879.

Volume 91
Number 12
$1.00 a Year

OCTOBER, 1927

Published monthly by
W. R. C. Smith Publishing Co.
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Published Monthly by

W. R. C. Smith Publishing Co., Dalton and Atlanta, Ga.

L. L. ARNOLD, Editor. **R. W. PHILIP, Associate Editor.**

Editorial and Advertising Department, Grant Bldg., Atlanta, Ga. Subscription price, $1.00 per year; Canada, $1.50 a year; Foreign, $2.00 a year. Entered at the Dalton, Ga., postoffice as second-class matter.

Contributions to the columns of Cotton are solicited and paid for after publication. The names of contributors need not necessarily be used, but must accompany all manuscripts.

Orders for any change in advertising must reach Atlanta previous to the tenth of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

When changing address notify us, not the postmaster. Always give the old address as well as the new one.

Volume 91 **Member Associated Business Papers, Inc.** **Member Audit Bureau of Circulation.** **No. 12**

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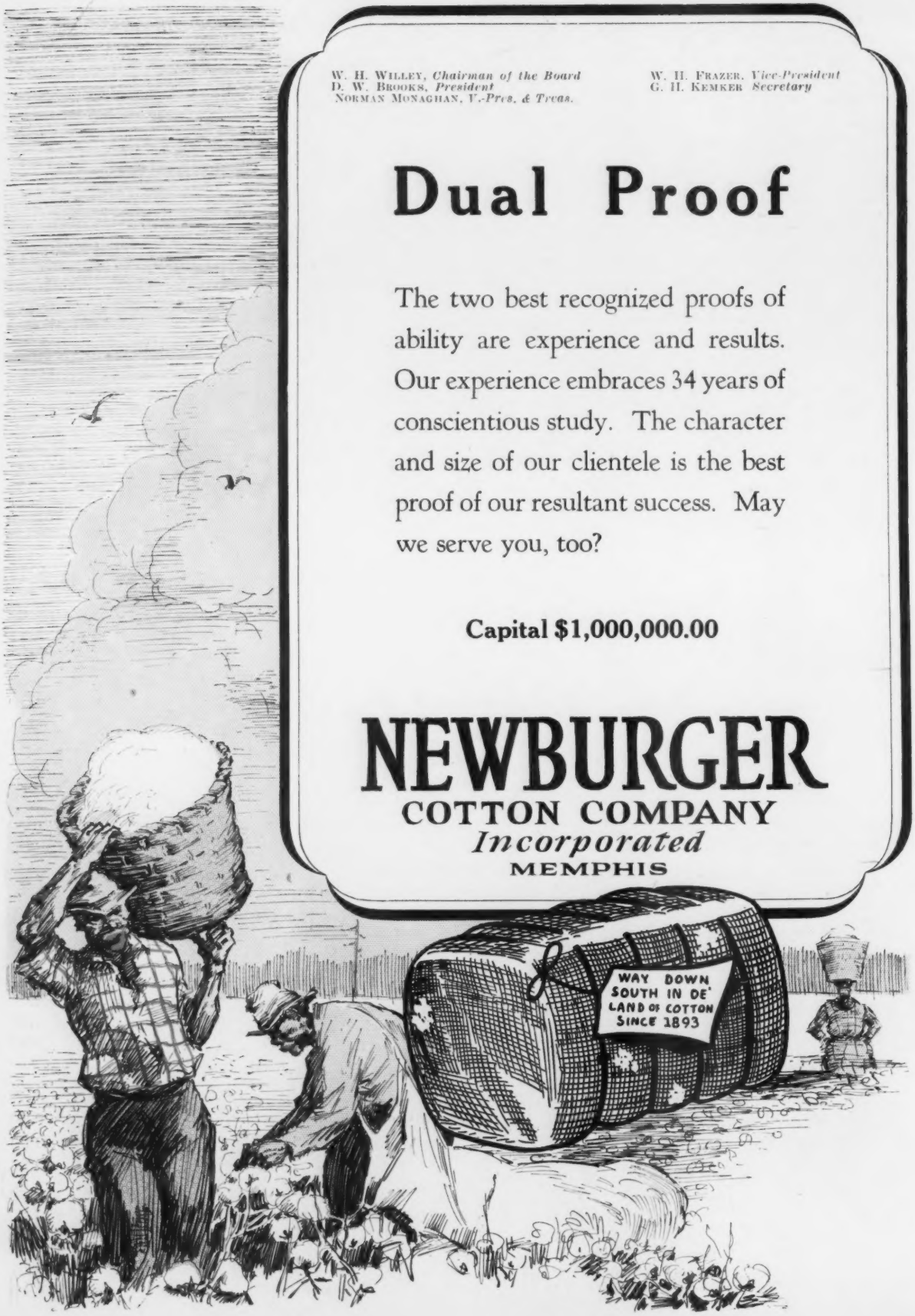
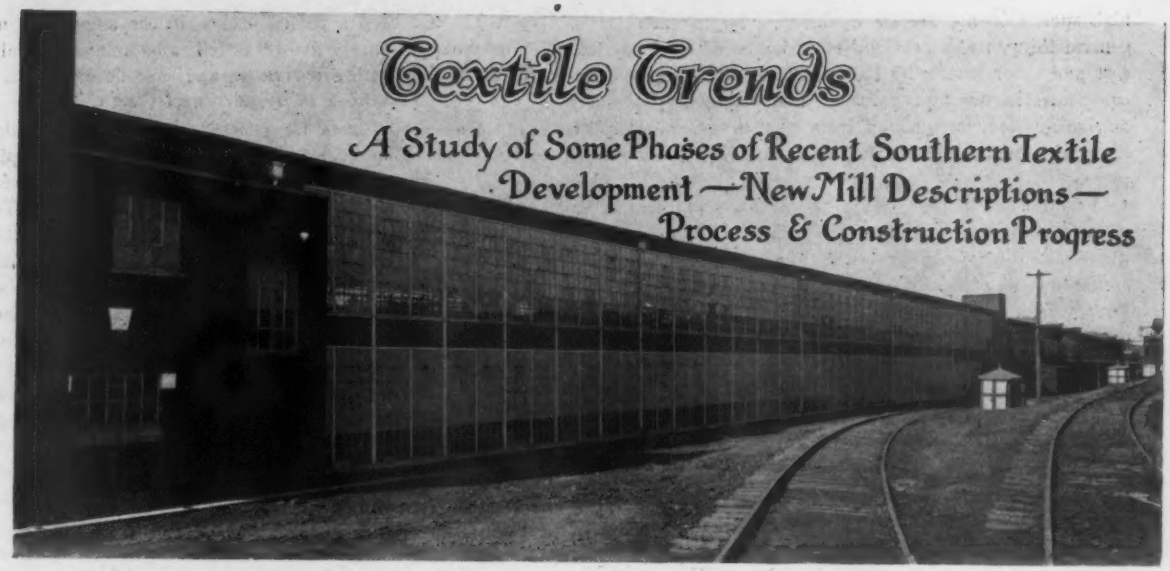




Textile Trends

A Study of Some Phases of Recent Southern Textile Development —New Mill Descriptions— Process & Construction Progress

Recent trends in the southern textile industry have been wholesomely along the lines of progress and improvement. Collectively, there has come about an organized effort of co-ordinated activity in correcting the mills' ailments and in building the foundation for a more prosperous condition; individually, the mills have been alert and aggressive in ways of strengthening their organizations, both along mechanical and distributive lines. All in all, even without consideration of immediate influences and prospects, it can be definitely stated that recent months have brought the industry up to a decidedly improved situation.

The most significant development, from the standpoint of the whole industry itself and that of general benefit, has been the organization and operation of the Cotton-Textile Institute, Inc., and the participation of the southern mills therein. The initial year or so of history of this organization, up to the present time, has provided the industry with a medium of activity that has been missing heretofore. The combined effect of a wholehearted interest and participation on the part of the mills, together with the sound, intensive and productive activity of that organization, which has at once elicited this spirit as well as having grown as a result of it, has already evidenced itself in a material way. The future, however, and what it holds for the industry through the Institute, cannot be predicted in any other way than optimistically, because of the foundation that is now being placed for the furtherance of its influence and the rounding out of its effectiveness. Its program is ambitious, but the achievement of it will arrive as a result largely of the active, earnest way in which the mills have received it; and this attitude, proper beyond a doubt, can be considered a most significant trend.

Institute Is a Vital Trend.

Capably headed and operating with an authoritative staff, the Institute has within a comparatively brief period of time, measured by other similar major developments, established its true position as an integral part of the textile industry of America. Conceived, and originally developed in the South, it has found in that section a stronghold of enthusiastic and helpful support.

In addition to the executive heads—President Walker D. Hines and Secretary George A. Sloan, aided by a picked group of mill men—the activities of the Institute have been established in the functioning of a department of statistics, a department of new uses, a cost department, a research department, and other, minor phases contributing to the work of these major divisions. Among the mills there have been formed five of a larger number of main groups, covering narrow sheetings, wide sheetings, print cloths, carded yarns, and osnaburgs, which will operate in the respective fields covered to carry out the work of the Institute along cost, statistical and other lines.

The unified effort of the cotton manufacturers, working through this medium which provides opportunities before unrealized, unquestionably will produce within the industry results as unusual and invaluable as is the organization itself in this field.

During this same period of the Institute's development, southern mill men have not been unawake to possibilities of improvement and growth. From the standpoint of business itself, since this particular phase falls outside the scope of this discussion, it may be dismissed briefly. In the South the past twelve or eighteen months have witnessed a continued operation among the mills, with accumulated stocks of manufactured products resolving into a minimum influence upon the market. Actual business, of course, has been spotty and in many respects unsatisfactory, but the managements have brought the mills through with a minimum of idleness, and while extraordinary profits were not the rule, the fundamental situation may be classed as an improvement.

Trends in Process and Construction.

The most outstanding element or trend among southern cotton manufacturers, considering now the individual units, has been the tendency toward the improvement of plant efficiency, mechanically and otherwise. Replacement of antiquated and well-used equipment, with newer and more modern machinery has been generally carried out throughout the section. Perhaps the most important major trend in machinery lines, considering individual processes, has been the attention given to the opening and cleaning machinery. Here many mills have found opportunity to increase efficiency, permitting in many cases a lower grade of cotton, and to cut corners of manufacturing cost and effort. The section is spotted with replacements of equipment in this division of manufacturing effort. While

high speeds do not necessarily indicate improvement, as a general thing, many possibilities of increased efficiency and cost and labor saving by the institution of higher-speeded equipment in warp preparation, a department previously much neglected, have arisen from a more serious study on the part of manufacturers of what might be accomplished there.

In addition to these major points, the application of modern conveying equipment in individual instances, improved lighting, heating, ventilating and humidifying installations, as well as those modern features of construction, such as flooring, roofing, machinery lay-out and the adaptation of specialized devices designed for economy and efficiency of operation—all these, found generally in a survey of mill activity, demonstrate the progressive attitude in which the mills have been equipping themselves within recent months.

As to plant expansion and increase in manufacturing equipment, there has been exceptional activity in mill additions to existing plants where generally attention has been paid to the latest developments in design and efficiency. In the cotton manufacturing field, there has continued a trend of Eastern investment in Southern properties, as well as an inside or local growth, the results showing a more diversified and expanded industry than is perhaps recognized from a restricted or casual observation. While perhaps there has not been a record broken in the amount of machinery expansion, the growth is felt to be unusually healthful compatible with conservative and sane development.

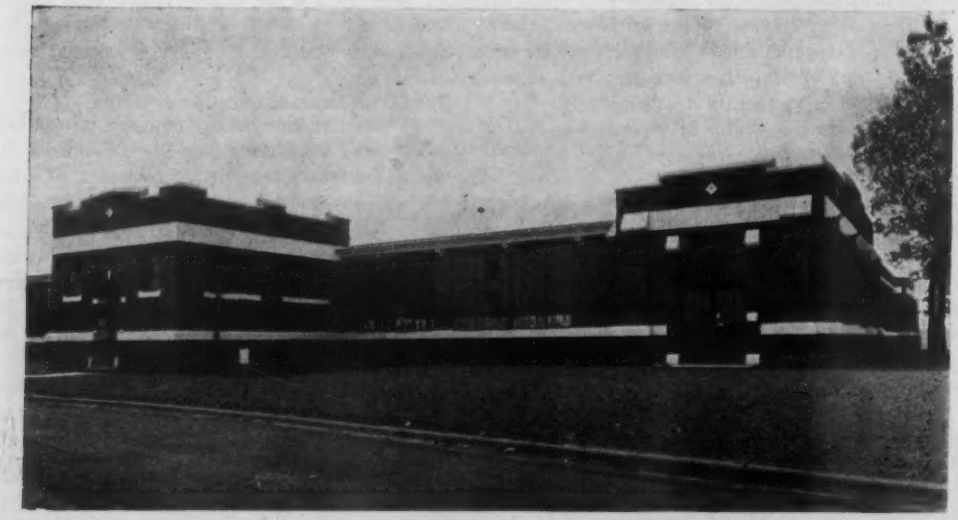
Instances of Important Growth.

The presentation of the general phases in this development, by describing, pictorially and otherwise, some typical instances of southern textile mills built during this period, is the function of the special features of this Southern Textile Expansion Number of COTTON, occupying the following pages. Since detailed descriptions of even the more representative plants treated would be impossible, it was decided to treat particularly one outstanding development and deal generally with the others. This method, it seemed, would show something of the diversified nature of the South's growth, both as to mill construction and process, and in the type of products manufactured. In taking a typical illustration, the mill and village development of the Chicopee Manufacturing Corporation of Georgia, at Gainesville, Ga., was selected for detailed treatment, since it involves the major phases affecting and affected by the southern textile expansion—the modern mill and equipment and village, up-to-date machinery, investment of eastern capital in the section, and diversification of the section's products—as well as possessing a number of unique and interesting features, which are emphasized in the appended description.

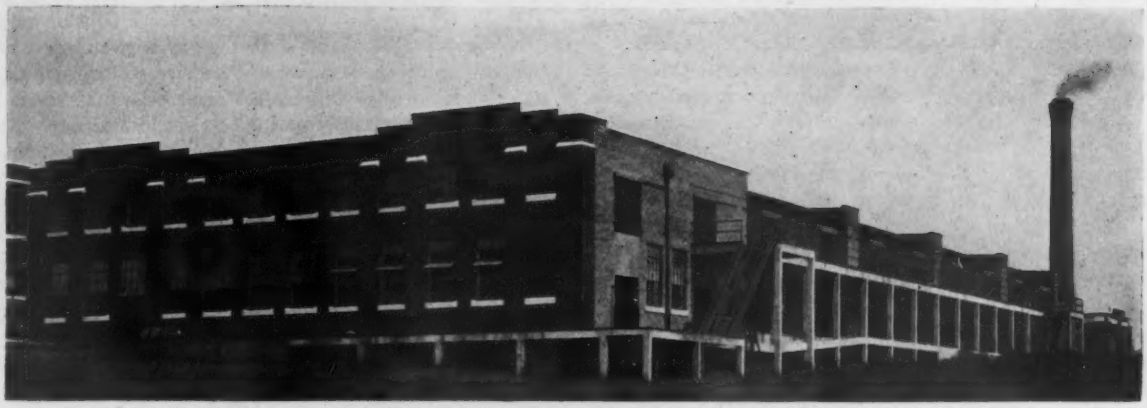
Any description of the textile development of the Chicopee Manufacturing Corporation of Georgia, at Chicopee, near Gainesville, Ga., must give first consideration to the extraordinarily unique and unusual features which combine to make it a most interesting contribution to the southern textile industry.

The Chicopee Manufacturing Corporation, a subsidiary of Johnson & Johnson, producing the surgical gauze, cheese cloth, etc., used by the parent company, late in 1926 began the erection of a new mill development near Gainesville. Ground was broken on December 1st, 1926, and on September 1st, 1927, production of cloth was well under way in a plant which has attracted the attention of the entire country.

With the products of the mill going into medical and surgical use, the company kept in mind the thought of



The end of the main mill building showing a closer view of the white terra cotta trim. One of the six entrance towers at the left of the picture.



Cotton Grading and Sampling Room, Opener Room and Warehouses. Steam Plant in the Distance.

cleanliness, sanitation and healthful conditions in the location and construction of their project. Built among the foothills of the Appalachian Mountains, strategically located as to transportation, labor and climate, the enterprise, to begin with, was ideally situated from every angle.

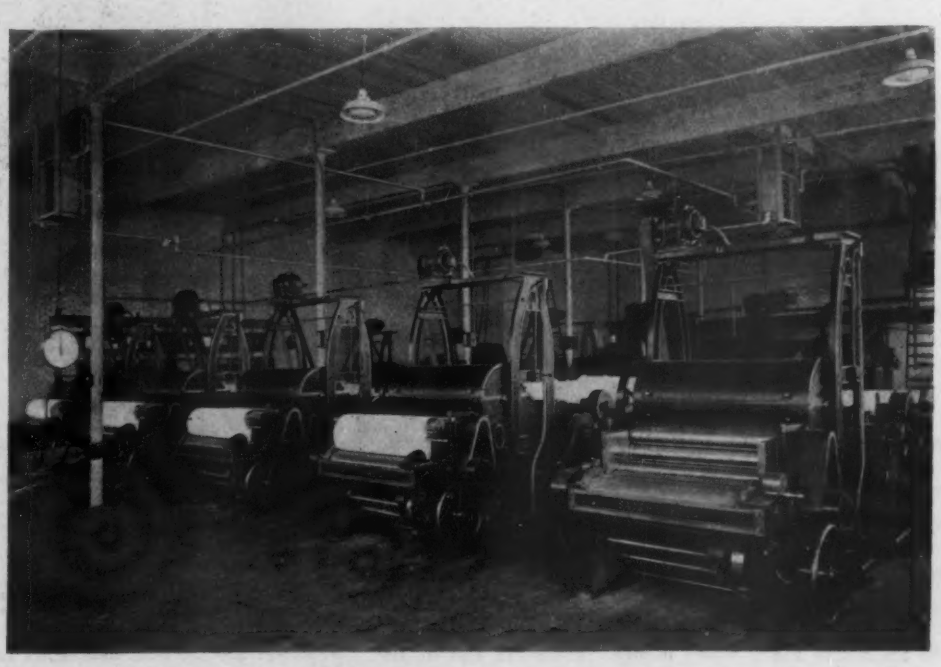
The mill properties proper, consist of one main manufacturing building, an adjoining building containing the machine shop, supply room and offices, an oil-burning heating plant and a two-story cotton warehouse. Each of these contains features of interest, and will be treated separately.

The main mill is a one-story structure, 954 feet long and 236 feet wide, and in it are contained all of the manufacturing operations representing 40,000 spindles and 1,000 looms producing surgical gauze, cheese cloth, bunting, etc. It is of face brick construction, with attractive white terra cotta coping, window facing, etc., and steel sash daylight construction with a double monitor extending the length of the building. All of the manufacturing operations are conducted on the one floor, and the machinery is designed and arranged to provide for a continuous flow of production from one end of the mill to the other. The roof is covered with Johns-Manville built-up roofing, insulated with Celotex. The ceilings are of selected structural southern yellow pine, and the floor is constructed of a rock base, bonded with asphalt and covered with concrete, over which are two layers of wood flooring and a final surface of maple.

Inside the mill, the walls are of white enameled tile. The Lupton steel sash used is fitted with Hires-Turner actinic glass, for the reduction of glare and the improvement of the light inside the plant. The American Moistening Company high-duty humidifier system is used, with Grinnell sprinkling equipment, and the mill is heated by the Venturafin fan system. The Benjamin glass and steel unit of semi-indirect lighting is used.

Outside of this equipment, there is no piping or wiring inside of the mill, there being two main tunnels extending underneath the entire length of the mill, with three cross-tunnels, in which all main steam pipes and electric feeders are located. Even the fire buckets are removed from the posts, these being located in pockets inset in the tile walls beneath the windows.

An interesting feature of the construction is the location of six separate entrance towers, located on the east side



The pickers are in the main mill building enclosed by a fire wall faced with white enameled tile. Individual motor drive is provided. The cotton is brought to this department from the openers through a pipe 1100 feet long.

of the mill. Three of these contain toilets and dressing rooms for men, while the remainder contain similar facilities for the women workers. The operatives use the respective entrances, donning immaculate white uniforms before taking up their duties in the mill. Lupton steel partitions are used in the towers, an individual Frigidaire unit for drinking water being installed in each tower, while six such units are found in the interior of the mill.

The opening equipment is located in the warehouse, which is situated at the south end of the mill. The cotton leaves this room in a conveyor pipe, which passes underground, under the railroad tracks, into the cloth room in the basement of the mill, and then emerges and runs the entire length of the mill, through one of the main mill tunnels, to the picker room, which is enclosed at the northwest corner of the main mill building by a fire wall that is faced, as are the interior walls of the mill, with white enameled tile. The galvanized conveyor pipe, from the opener room to the picker room, is approximately 1,100 feet in length. The portion underground is covered with three coats of asphalt felt, furnished by the Ric-Wil Co., for insulating and protecting the pipe from the moisture of the ground.

A Glimpse of the Roving Frames.

From the pickers, which consist of breakers and finishers, the laps are taken to the cards, which occupy the remainder of the north end of the mill. Next, in a continuous flow of material manufacture, come the drawing frames, slubbers, intermediates and speeders. This machinery representing the carding department, is separated from the spinning room by Lupton steel partitions fitted with panels of Mississippi wire glass. All of the machinery in the opening, picking, carding and drawing were supplied by the Saco-Lowell Shops. The roving frames were secured from the Woonsocket Machine & Press Company.

Moving next down the mill, there is the spinning room, equipped with approximately 40,000 spindles, the frames being Fales & Jenks; twelve Universal winders and four Entwistle high speed warpers. Tape-drive spinning is used, as is the Universal system of winding and high speed warping by means of the Universal magazine creel. Boyce weavers knotters, made by the Mill Devices Co., Inc., Gastonia, N. C., are used in the warp preparation.

From the spinning room, the filling quills are trucked to the weave room, which occupies the south end of the mill. The warps are taken to the slasher room, where are located three Saco-Lowell slashers, a Barber Colman warp-tying machine, etc. The slasher room is partitioned off from the spinning department. All size cooking, storage, etc., is located in a concrete basement below the slashers, connected to the slasher room by a circular stairway. Another similar concrete basement contains the humidifier tanks, pumps, etc.

The weave room, as do the carding and spinning departments, extends the entire width of the mill, and, as stated, occupies the south end, being partitioned from the spinning and slashing departments with steel and wire glass partitions. It contains 1,000 Draper automatic looms, of which 750 are 40-inch and the remainder 42-inch.

A basement at the south end of the mill is used for cloth inspection, packing and storage. Here are located Curtis and Marble stitchers and Singer sewing machines for the finishing of the goods.

Railroad trackage connecting with the main double-track line of the Southern Railroad between Atlanta and Washington is run between the south end of the mill and the cotton warehouse, thus expediting the unloading of cotton and supplies and the loading of finished goods on the same trackage. This track extends to the heating plant, and tank cars of oil may be unloaded from it into the storage tanks.

Every machine in the mill is individually driven from an electric motor, General Electric motors being used throughout. All of the drives are direct or gear-connected, with the exception of the Sturtevant suction fans and the spinning frames, which have a Link-Belt chain on each drive and the slashers, which are driven from individual motors with belts.

Drawing Frames with Individual Motors.

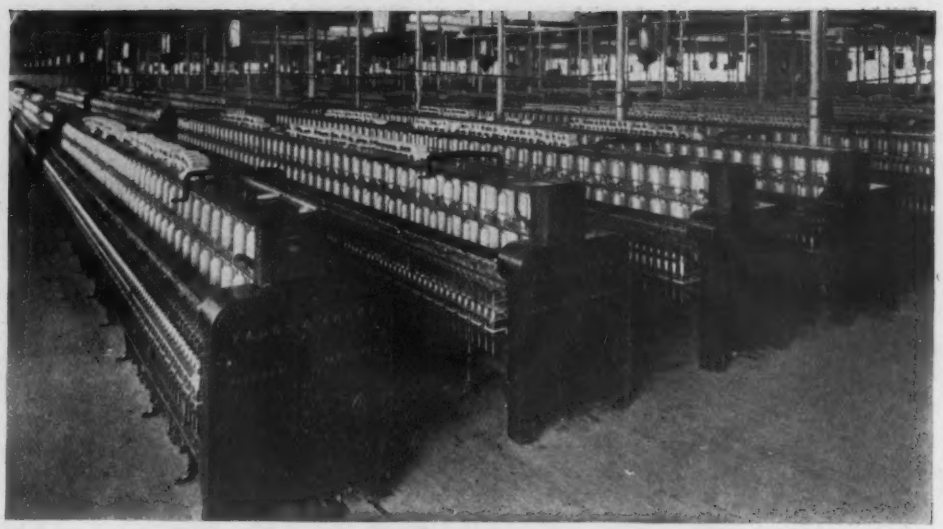
In every department are located Bowser departmental storage tanks for lubricating and other oils. These are conveniently situated in each division of the mill.

The Warehouse.

The cotton warehouse is a two-story structure, of the same brick and architectural tile construction as the main mill and other buildings. It has two levels of storage rooms for cotton, with a cotton grading and sampling room on the second floor, and the opening equipment, consisting of a bale breaker and feeders in tandem, vertical opener and Saco-Lowell No. 12 lattice opener, on the first floor.

The Oil Heating Plant.

Power for the mill, and lights for the mill and village, is furnished by the Georgia Power Company through three



A view in the spinning room.

transformers, having an installed capacity of 3,750 k.v.a. The mill also has a 300 k.v.a. transformer at the pumping station, used for pumping water for the mill and village. Heat for the mill and steam for the slashers is produced by an interesting plant consisting of two 200-hp. Brunswick-Kroeschell boilers, equipped with Todd dry dock oil burners, Copes regulators and Warren Webster feed water heater. Crude oil is used for fuel, there being two 24,000-gallon storage tanks underground, which may be filled from tank cars, as stated. The heating plant is housed in a building constructed similar to the other buildings, of brick and architectural tile construction. This is perhaps the first instance of the use of crude oil for heating and process work in the southern textile industry. This building also contains two Allis-Chalmers fire pumps for emergency use.

The Machine Shop, Store Room, Office.

The fourth main building in the group houses the company offices, machine shop and supply room, as well as the General Electric switchboards controlling the electrical supply for both the main mill and the village. Wood block floor is used for the machine shop, and Lyon metallic shelving has been used to equip the store room, where supplies are kept. The office quarters are beautifully appointed and finished, a huge bronze door opening into the reception room from the entrance, which is located upon the main Appalachian Scenic Highway. A covered walkway extends from the machine shop to the main mill building.

The Chicopee Village.

The main Appalachian Scenic Highway, referred to, carrying the travel from the South to the East, traverses directly through the Chicopee properties. On the one side is presented the impressive and attractive manufacturing plant just described, and on the other side lies the Chicopee village, which is a well designed and landscaped in-

High Speed Warpers and Magazine Creels.

The Slashers. The Size Mixing Vats are in the Basement.

A Vista Down the Weave Room.

dustrial community. Here are found more than 200 operatives' houses, each built of tapestry brick, and varied in size, shape and color, giving each an individual distinction. There are some 31 different types of houses in the village. The streets were laid out on a rolling and winding terrain, every street being paved and concrete gutters, curbing and sidewalks being laid throughout the entire village. All village wiring is underground, the electric street lights being of the General Electric Company's Novalux unit.

There is located in the village a modern store building, containing a general store, barber shop, etc., the mill company operating the store. There also is a school house, as well as a community building where the social life of the village centers, and while development work is still progressing, an outdoor swimming pool, tennis courts, and athletic field, and other facilities are in prospect.

On the mill property is a water reservoir and water

There are 31 different types of houses in the village. All streets are paved and concrete gutters, curbing and sidewalks provided. All village wiring is underground. Tapestry brick and asbestos shingles are used in all house construction. Each house has bath, toilet and lavatory, electric water heater, electric stove in the kitchen and 40 telephones are located at convenient points in the village.

filtration plant, being a Roberts filter with Pennsylvania pump, of 750,000-g.p.d. capacity, and two R. D. Cole tanks.

Description of Houses.

The individual homes in the village provide a subject of considerable interest. As stated, they are all built of tapestry brick, and the village contains 31 different types. Each house is covered with Johns-Manville asbestos shingles, and has a railed front porch, above which a varicolored stucco coping adds to the beauty of the structure. Each is situated on a sodded lot, with a concrete walkway to the porch from the sidewalk.

Every home is equipped for electric lighting, there being a drop light in each room, with wall sockets in some of the rooms. Every room except the kitchen, has a coal grate fireplace with ornamental mantel, while each kitchen is equipped with an electric stove, and a Red Crown electric water heater furnished by Hynes & Cox Electric Corp., Albany, N. Y. Each house has a bath room fitted with porcelain fixtures, toilet, bath tub and lavatory, all piped for running hot and cold water. The walls are plastered and the woodwork artistically stained.

Throughout the village are located sufficient five and six-car garages to care for the automobiles of the operatives. These garages are faced with tapestry brick and covered with asbestos shingles, and are fitted with heavy wooden doors equipped with modern hardware. A wash stand with drain is located at the end of each set of garages, to which paved and curbed driveways lead from the streets.

Forty telephones, connected through the office switchboard, will be located at convenient points in homes throughout the village.

Garbage and refuse is collected daily from every house in the village and disposed of in a modern incinerating plant. This collection is made, not by emptying each can into a cart, but by removing the can entirely and leaving a clean receptacle in its place.

The Chicopee Experimental Farms.

As was reported several months ago, the company has instituted experimental farms in counties adjoining that in which their plant is located, for the scientific culture of long staple cotton. The initial experiment included four forty-acre tracts in four different counties, where the growing of Acala long staple cotton is being developed. The company is furnishing the seed and fertilizer, and has also provided four tractors, four harrows, and four tractor plows for this work.

Due to space limitations in this issue, this description of the Chicopee development is necessarily brief and general. Its purpose, however, is to give a general picture, by word and photograph, of a typically modern, impressive and important southern mill development, possessing at the same time a number of unusual points that will be of considerable interest.

J. E. Sirrine & Company, of Greenville, S. C., were the architects and engineers for the entire project. Fiske-Carter Construction Company, Greenville, S. C., was the contractor for all buildings, including the mill and village. The Grinnell Company, Charlotte, N. C., supplied all piping for fire protection, heating and air conditioning.

The Henry Construction Company, Greenville, S. C., installed all piping for water supply and sewerage, as well as the sidewalks, gutters and streets. Huntington & Guerry, Greenville, S. C., installed all electrical equipment in the mill and village. E. S. Draper, landscape architect and city planner, Charlotte, N. C., was in charge of landscaping the grounds of the mill and village.

West Boylston Mfg. Company of Alabama.

An indication of the trend of eastern spindles to move to the South is evidenced by the plant being completed at Montgomery, Ala. The mill building will house 30,000 spindles removed from the plant of the West Boylston Manufacturing Company at Easthampton, Mass. The Alabama development is under the same management as that at Easthampton, and is called the West Boylston Manufacturing Company of Alabama, Inc., and will manufacture automobile tire cord.

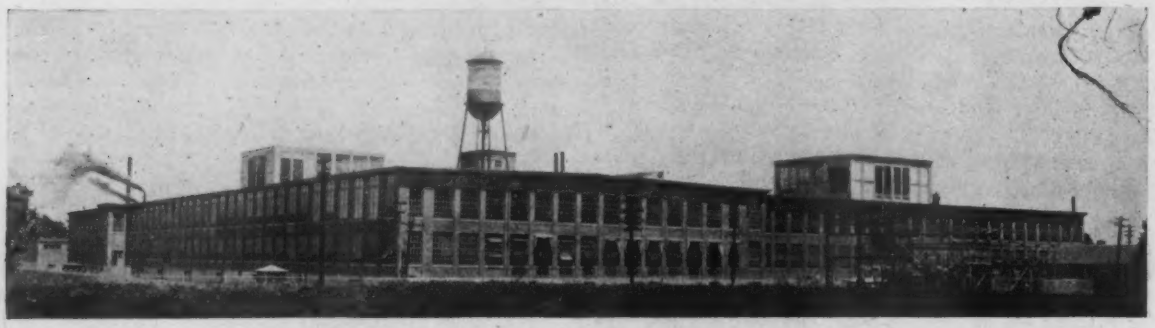
The main mill proper is 134x450 feet, three stories high. The construction of the building consists of brick and steel sash outside walls, cast iron columns, steel floor and roof beams, and heavy plank floors and roof. The steel sash, with the exception of the lower line of lights, is glazed with a special amber colored glass to diffuse the natural light rays, eliminating the direct rays of the sun and consequent glare. The future extension program contemplates an ultimate development of 60,000 spindles, and a three-story building 134x900 feet long.

The cotton opening compartment and the picker department are in a detached three-story building. This building is 102x170 feet, with plans for future extensions contemplating a finished building 286 feet long. The picker room is connected to the carding department on the second floor of the mill by means of a closed, overhead trucking passageway. In addition to the opener and picker rooms, this building contains six compartments, 50x100 feet each, which serve for cotton sorting and storage, waste sorting and storage, and machine shop. The machine shop is likewise connected to the second floor of the main mill by means of a closed passageway, it being on the second floor of this building.

The mill is electrically operated, but there is a detached steam plant, 40x40 feet, for furnishing steam to the heating plant. The mill is served by two elevators, and the detached building by one, all electrically operated.

Process Photo of the New Alabama Plant of the West Boylston Mfg. Company.

In addition to the structures described, the development includes a village which will serve to house the day operatives and employees of the mill. The village consists of 174 cottages, comprising 513 rooms. There is sufficient acreage on the property to take care of the necessary houses for future development. There will be adequate garage facilities provided to take care of the employees' needs. All streets and sidewalks are graded and curb and gutter provided. All streets and sidewalks have been surfaced with gravel. An extensive program of landscaping and planting is contemplated. The village is supplied with complete water and sewerage systems; houses are equipped with an up-to-date plumbing system, including necessary plumbing fixtures. The village is also equipped with a complete street lighting system, and house lighting, all fixtures in the houses being controlled by push-button switches.



Exterior of the Goodyear Clearwater Mills, Cedartown, Georgia.

A portion of the Goodyear Clearwater twisting department Note the steel frame building construction and the central station humidifying system.

The houses in the village are of frame construction, of varied design, no two houses being identical. All floors are double floors, and all walls and ceilings are plastered. The roof material is asphalt, slate surfaced, fire resisting shingles, all shingles being green in color.

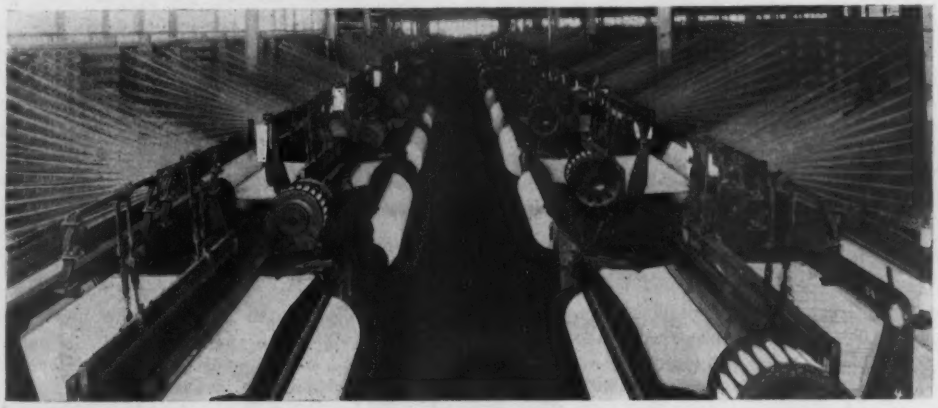
In addition to the foregoing, there will be a community center building composed of stores, shops, lodge rooms, etc.

Robert and Company, Inc., architects and engineers, of Atlanta, were engaged by the owners to handle the construction and engineering program, and Batson-Cook Company, of West Point, Ga., were the general contractors on all structures, including the village cottages.

Elevators were furnished and installed by the Otis Elevator Company. Fire protection was furnished and installed by Crawford & Slaten, heating and piping by the Seeley Company, Inc., both of Atlanta. The humidification system was installed by Parks-Cramer Co. J. S. Schofield's Sons furnished and installed the boilers, the heat control system is by the Johnson Service Company, R. D. Cole Manufacturing Company supplied the tank and tower, the boiler room stack was built by the Alphons Custodis Chimney Construction Company of New York. The power and light wiring was installed by J. M. Clayton & Company, Atlanta, and General Electric Company furnished the motors. Alabama Power Company supplies the power. The steel sash are "Fenestra" sash, the structural steel is from McClintin and Marshall Company.

Goodyear Clearwater Mills, Cedartown, Ga.

During the past few months, the Goodyear Tire & Rubber Co., Akron, Ohio, have completed the erection of a new tire fabric manufacturing plant at Cedartown, Ga., known as the Goodyear Clearwater Mills, representing an installation of 30,000 spindles and complementary looms. In securing the location for the plant, the original Mill No. 2 of the Cedartown Cotton & Export Company, known as the Paragon Mill, was purchased, this containing 12,000 ring spindles and 5,000 mule spindles, the latter being displaced. The additional spindles to bring the equipment to



A vista through the Goodyear Clearwater weave room showing warps drawn from creels.

30,000 spindles, were removed to Cedartown from the plant of the Essex Cotton Mills, at Passaic, N. J., which had been jointly purchased by the Goodyear people and the Fisk Rubber Company.

In designing the new mill, the Paragon mill was retained as the nucleus for the plant, and a two-story, L-shaped building was erected connecting directly with the original plant. The new mill building is 143x507 feet, with a 148x252 foot ell.

Also, three new storehouse sections were constructed, 50x120 feet each, two being one-story and the other two-story with a waste house in the second story.

A self-supporting steel frame is used throughout in the new construction, with steel columns in the outside walls surrounded by narrow brick pilasters. The floor and roof beams are of steel with heavy plank roof and floors.

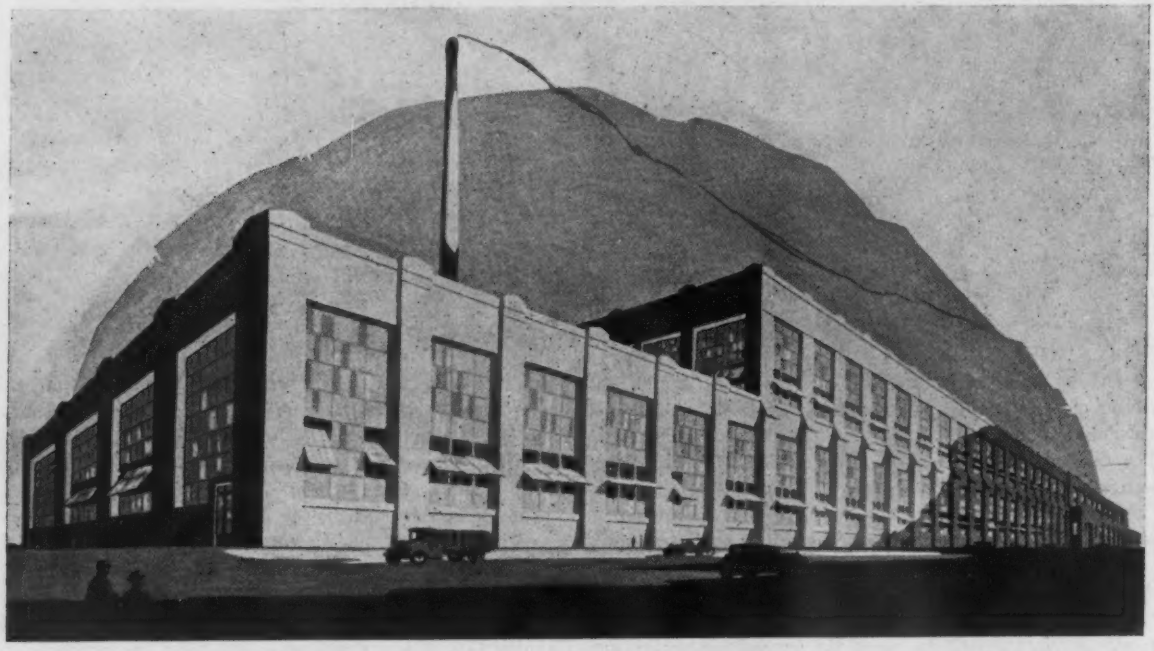
The mill is so laid out that all of the spinning and twisting is located on the second story, and a Parks-Cramer central station humidifying system was used, two large fan houses being located on the roof and containing all of the conditioning apparatus.

Lockwood, Greene & Company, Inc., Boston, were the engineers engaged to prepare layouts for all machinery, motors, wiring, transmission, etc., and to make the construction and equipment drawings for the mill. The securing of bids and placing of contracts and supervision of construction and installation was handled by the Goodyear company's engineering department. Hunkin-Conkey Construction Co., Cleveland, Ohio, were the general construction contractors. Fire protection and heating equipment was furnished by the Grinnell Co., and elevators by the Otis Elevator Co. Parks-Cramer Company supplied both the central station and head systems of humidification. Walker Electric Company, Atlanta, were the electrical contractors. The village houses built were designed by the company's engineering department, with the construction being done by Daniel Lumber Co., LaGrange, Ga.

Dixie Mercerizing Company, Chattanooga, Tenn.

One of the large textile developments completed in Tennessee during the past year was the addition to the Dixie Mercerizing Company's spinning department, at Lupton City, Chattanooga, Tenn. The spinning department of the Dixie Mercerizing Company is located at Lupton City, some eight miles north of Chattanooga, and with the completion of this new project, the mill has some 40,000 spindles. Since the first unit of 13,000 spindles was built, the company has yearly authorized a building program, which has culminated in a completed 40,000 spindle unit for the manufacture of fine yarns.

Lupton City is an outstanding example of the better type of mill villages in the South. The topography of the village is such that practically all of the streets have been laid out with wide curved base lines. The village has its own community center which consists of schools, churches, motion picture auditorium and community stores. At the present time the mill employs some 500 people.

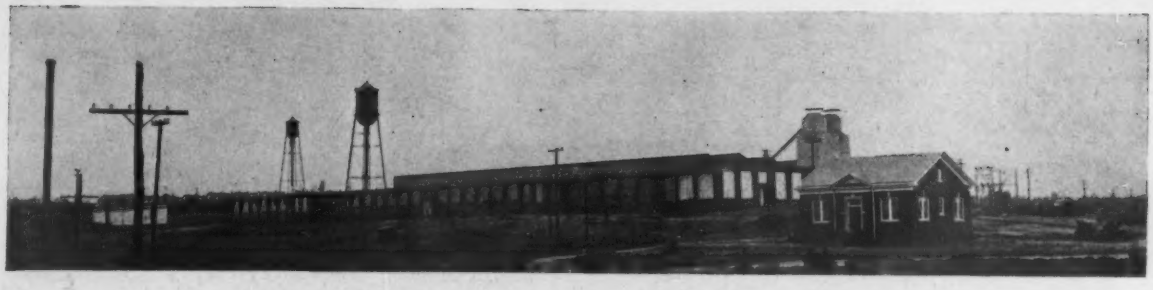


Dixie Mercerizing Company, Chattanooga, Tenn.

The building program just completed consists of a main mill building, one and two stories, 107x363 feet, together with 60 village cottages. The completed unit is some 990 feet long, two stories, and faces Lupton Drive, the main boulevard in the village.

The main building has been designed to give a maximum amount of light, and this is emphasized in the 17-foot wide windows. Every other column in the main mill was omitted to provide an economical layout of machinery, steel beams being used throughout. The exterior of the mill shows a Gothic influence in design, the pilasters terminating in appropriate stone caps at the second story line.

On account of the range of yarns spun, the picker room on the second floor divides the mill into two units, the card rooms being laid out north and south from this point. The roving drops to the first floor at each end of the mill and returns through the spinning to the finishing room underneath the picker room. It is interesting to know that



Blankets are Made at the Arnco Mills, Newnan, Georgia.

the Dixie Mercerizing Company was one of the first mills in the country to adopt an individual electrical drive on cards. With this drive, the mill is one of the few installations in the South entirely individually electrically driven.

Robert and Company, Inc., architects and engineers, Atlanta, were the engineers in charge of the entire development. A. K. Adams and Company, Atlanta, were the general contractors.

Arnco Mills, Newnan Ga.

In the early part of 1926, the leading citizens of Newnan, Ga., being interested in the development of manufacturing in their town, organized the Arnco Mills, which has the unique distinction of having all the capital stock subscribed by local citizens. The mill was designed to manufacture part cotton and wool blankets. The first stock was started through the machines during April, 1927.

The main mill building is 152 x 436 feet, one-story, with saw-tooth roof, steel columns and roof framing and steel sash throughout. The outside walls are brick, and the roof is a 20-year Barrett Specification roofing on three-inch planking. The floor rests on the ground and is composed of a 4½-inch concrete slab with two-inch creosoted planking bedded in one-inch sand-tar rock upon which is laid one-inch intermediate pine plank and the maple top flooring.

In addition to the mill, there is a 40x40 foot boiler house, and three 50x100 foot sections of warehouse. The buildings are sprinklered, and are protected with a 50,000 gallon elevated steel tank, a 1000 g.p.m. electrically driven Underwriter's fire pump and a 500,000 gallon storage pond used exclusively for fire protection.

Individual Frigidaire automatic cooling drinking fountains are provided throughout the mill and in the office. The mill is operated by electrical power purchased from the Georgia Power Company. Individual motor drive is used in the mill.

The village was laid out on the hillside in the rear of the mill, and has 75 operatives' houses, four overseers' houses and the superintendent's house. Each house is situated on a lot with 100 foot frontage. There is a separate office building, built with brick walls and slate roof.

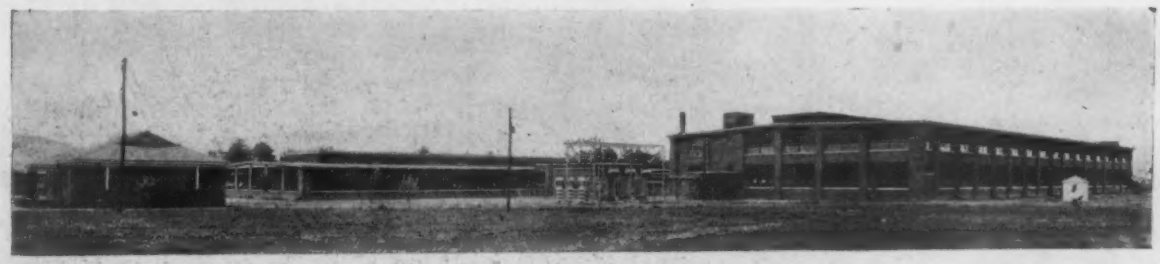
Alton W. Arnall is president and treasurer of the mill, and T. A. Caston is superintendent. Lockwood, Greene & Co., Inc., of Boston and Atlanta, through the Atlanta office, were engineers for the project.

Sayles-Biltmore Bleacheries.

An illustration of the southern expansion along lines of textile finishing is found in the plant established by the Sayles Finishing Plants, Inc., of Saylesville, R. I., at Biltmore, near Asheville, N. C., which is known as Sayles-Biltmore Bleacheries.

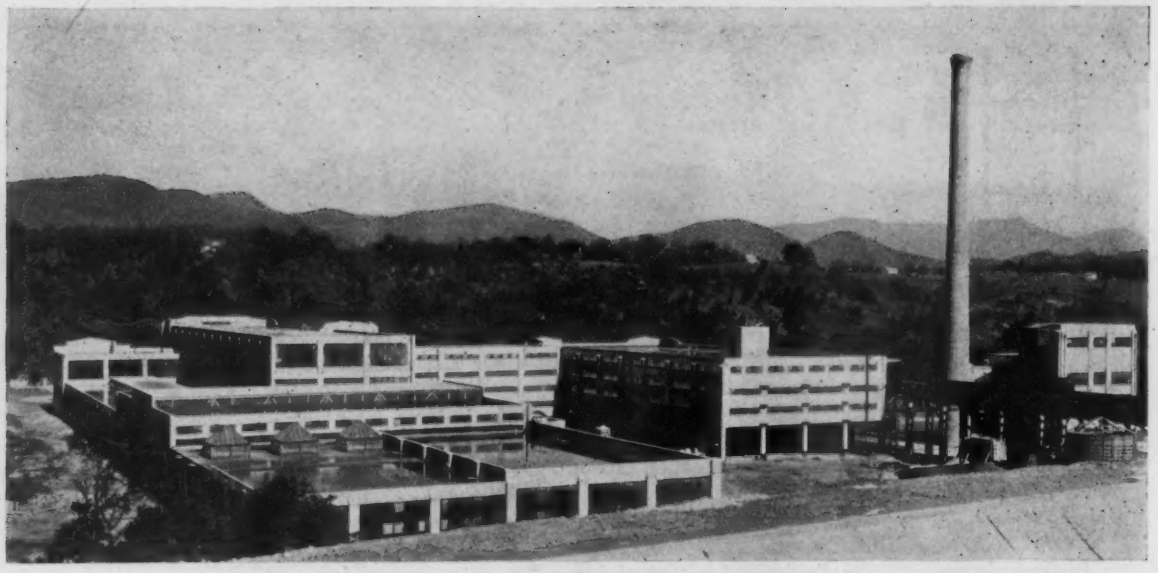
This plant, now in full operation with an average capacity of more than 1,000,000 yards of cloth per week, was constructed by Fiske-Carter Company, with J. E. Sirrine & Company, of Greenville, S. C., as the engineers. Its up-to-date features of construction and process combine with an advantageous natural location in presenting a representative illustration of a modern finishing plant.

The manufacturing property consists essentially of three major buildings. The bleachery proper is located in a main building, 632x150 feet, being of one-, two- and three-story construction. Here all of the process work is carried on, from the cloth in the gray state to the packing. An auxiliary building, 225x100 feet, is connected with the manufacturing plant by a four-story bridge. Here are located facilities for storing gray and finished goods, supplies, machine and box shops, etc. The third main building houses the power plant, which for the bleachery was designed for the dual demand of power and process steam. The main generating unit is a 750 k.w. turbo-generator, with an auxiliary 200 k.w. synchronous machine. There are two water tube boilers in battery, giving 956 horse-power.



Southern Brighton Mills, Shannon, Ga.

The Brighton Mills, tire fabric producers, of Passaic, N. J., acquired a site of land near Rome, Ga., and, calling it Shannon, erected a plant for housing 25,000 spindles producing tire cord and related fabrics. The equipment was transferred from the Passaic Mill. A complete mill community has been developed. J. E. Sirrine & Co., were the engineers.



Sayles-Biltmore Bleacheries, near Asheville, North Carolina.

The conditions surrounding the plant are ideal in practically every respect, supplying an agreeable climate, splendid water for finishing purposes, an abundant available labor supply of the highest type, and excellent railroad facilities for incoming and outgoing shipments to all parts of the country.

This plant, which represents the latest development of the company, as well as their first southern unit, gives the complete organization a capacity of 10,000,000 yards per week, with the southern production added to that of the original plants of the company in Rhode Island.

The site of 200 acres on which the plant is located provided exceptional opportunities for a plant village, and by careful planning work and the conservation of the natural beauty of the site, a most attractive village has been erected in conjunction with the bleaching and finishing plant.

Albemarle Weaving Co., Charlottesville, Va.

A plant for the manufacture of Jacquard fabrics of cotton, silk and rayon for draperies and upholstery use has just been completed by the Albemarle Weaving Company, Charlottesville, Va. The building is one-story, containing 20,000 square feet of floor area, and is of brick wall construction interior steel framing with plank roof. The floor construction is tar rock on earth with pine underflooring and maple top.

Sawtooth roof construction is provided to give the finest possible light and the height of 16 feet to the base of the roof beams gives liberal space for the gantry framing supporting the Jacquards.

Necessary space and proper arrangement for the preparatory and finishing machinery is provided.

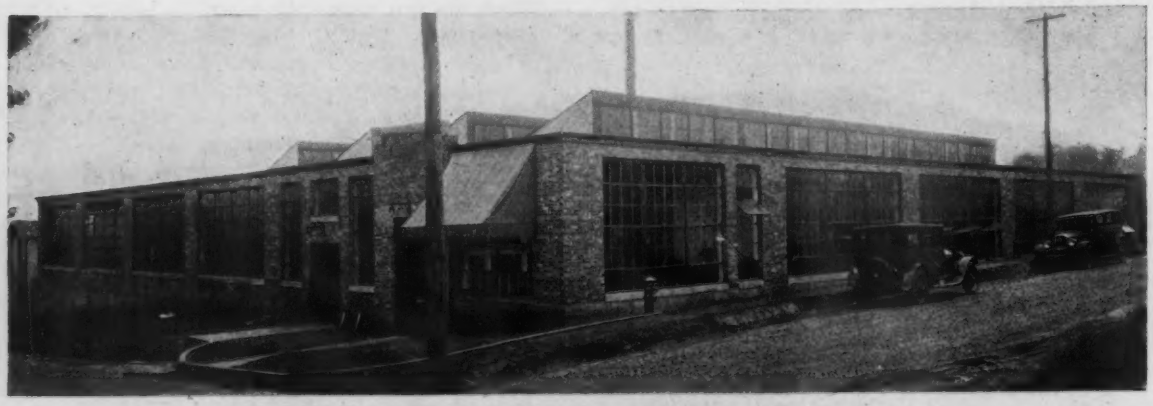
The electric conduits for power supply to the machinery are carried in the floor. Cooper Hewitt lights are used for illumination in the manufacturing sections.

The installation includes an undivided boiler plant for the mill for process steam and weaving purposes.

The Albemarle Weaving Company have a considerable tract of land in addition to the mill site, and provision has been made with a temporary end for the enlargement of the building as the growth of the business demands. Lockwood, Greene & Co., New York, were the engineers.

Stehli Silks Corporation, Waynesboro, Va.

The Stehli Silks Corporation are now operating a silk throwing unit at Waynesboro, Va., located on the Jefferson Highway, in the Shenandoah Valley. The building is one-story and part basement, being 147x158 feet, with a



Plant of the Albemarle Weaving Company, Charlottesville, Va.

An interior view of the plant of the Albemarle Weaving Co., Charlottesville, Va. Jacquard fabrics of cotton, silk and rayon for draperies and upholstery use is the product of this mill.

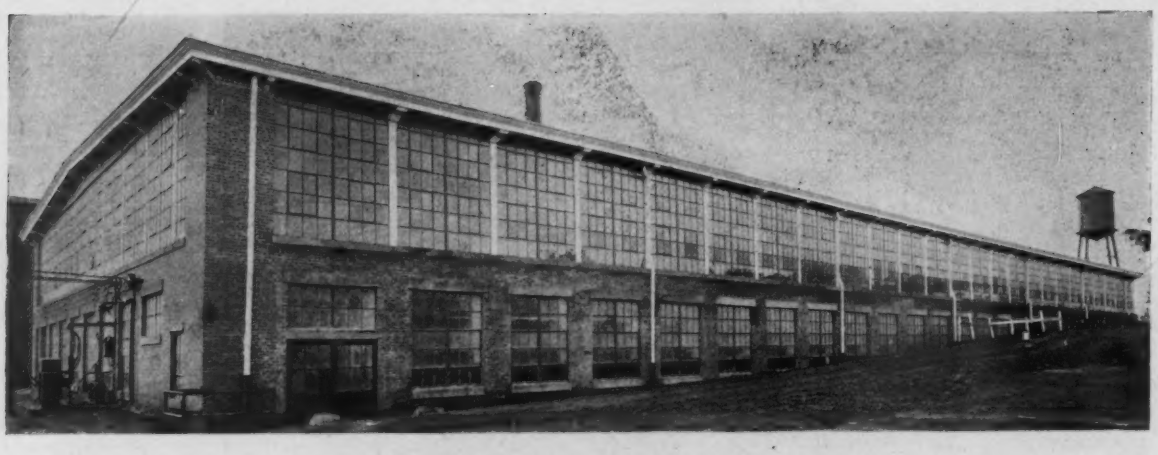
52x147 foot basement. There is a natural slope to the ground downward from the street on which the plant faces, bringing the main floor at street level and the basement at yard grade in the rear of the building. It is of steel frame construction with brick walls, the street frontage being of face brick. The roof is sawtooth of plank construction on steel frame with Barrett twenty-year bonded roofing. Steel sash is used in the side walls as well as in the roof construction. Column spacing is 24x26 feet, permitting a very efficient arrangement of machinery. The main floor is supported on steel framing throughout with pine underflooring and maple top. The basement floor is concrete, cement finish.

Throwing machinery and office occupy the entire main floor and the basement comprises silk and transformer vaults, both of fireproof construction, boiler room, and soaking room. Electric power is purchased and the boiler plant, consisting of two Kewanee locomotive type boilers and self-supporting steel stack, furnishes steam for heating and process requirements. The mechanical equipment, including electrical work, ventilation, sprinklers, heating and plumbing, is modern and up-to-date. A steel sprinkler tank and tower is of the proper size and location to serve a future enlargement of the plant in preparation for which a temporary wooden end is provided. Lockwood, Greene & Co., Inc., New York, were the engineers and architects for the work.

Sauquoit Spinning Co., Gadsden, Ala.

The Sauquoit Spinning Co., of Utica, N. Y., in 1927, started a new spinning mill of 20,000 spindles at Gadsden, Ala., manufacturing carded and combed yarns. The main building is two-story, 100x400 feet in dimensions, with a two-story picker room wing, 80x52 feet, which is located on the rear side of the mill and contains as well the ma-

A Silk Throwing Unit of the Stehli Silks Corporation, Waynesboro, Va.



Lad Lassie Mills, Anderson, S. C.

This plant represents an expansion of the Gossett and allied interests, being erected near the Riverside & Toxaway Mills, and containing 300 looms for the production of the "Lad Lassie" line, formerly produced in the Brogon Mills, Anderson, which were sold to the Appleton interests. J. E. Sirrine & Co., were the engineers on the building project.

chine shop and conditioning rooms. There is also a one-story ageing room adjoining the picker room, to which is built a fireproof boiler building, used for heating and process steam.

Group drive is used throughout the mill, power being

Sauquoit Spinning Co., Gadsden, Ala.

secured from the Alabama Power Company.

The mill is built with steel beams, cast-iron columns, brick walls and steel sash, with monitor on the second floor. A battery of warehouses, containing the opening room and waste house, is of standard mill type construction. The mill is equipped with a vacuum heating system, with automatic heat controls. Robert & Company, Inc., were the engineers.

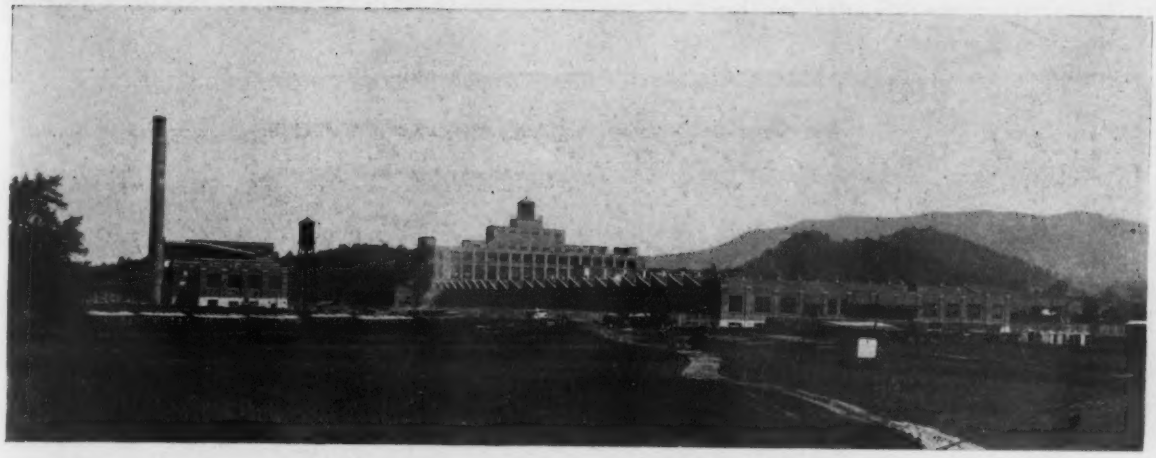
General Details Giving List of Other New Mills and the Larger and More Important Additions.

It would require unrestricted space for the detailed description of all of the new plants erected during the period covered; without consideration of the important additions, representing in some cases complete units as adjuncts to existing plants. Therefore, the following paragraphs will attempt only to record the individual plants.

Rayon manufacture in the South was expanded tremendously by the establishment of the American Bemberg Corporation's plant at Johnson City, Tenn., which, according to very recent announcements, will be expanded three-fold, in addition to a development at the same place, of immense proportions, by the American Glanzstoff Corporation. The Dupont Rayon Corporation, Old Hickory,

Thomas Henry & Sons, Inc., Nashville, Tenn.

Indicative of the trend of eastern interests to the South, and also of the diversification of products manufactured in that section, is the mill established by Thomas Henry & Sons, Inc., of Philadelphia, in Nashville, Tenn., where 20,000 spindles and 280 looms are installed for manufacturing "Woolmix" merino yarns, turkish towels, etc. Slow-burning mill type construction was used on the buildings. There is a main mill 107 x 312 feet, with a weave shed, 110 x 107 feet, and a three-story picker room wing adjoining the main building, and a boiler room and machine shop adjacent to this wing. Steel beams, steel sash and brick walls were used throughout the plant. Robert & Company were the engineers and architects.



American Bemberg Corporation, Johnson City, Tenn.

This plant is representative of the development in rayon manufacture in the South. The American Bemberg Corporation, formed to build and operate the Tennessee plants, is a subsidiary of the J. P. Bemberg Company, Barmen, Germany. It is capitalized at $17,500,000. Construction on the first unit, shown above, was completed in October, 1926, at a cost of approximately $3,500,000. It covers about ten acres, and is now employing about 2,000 people. The second unit, to duplicate the first plant, is now under construction. The ultimate plans call for five such units. The American Glanzstoff Corporation also are building a rayon plant at Johnson City, to be twice the size of the Bemberg plant. The company is capitalized at $37,000,000. Lockwood, Greene & Co. are the engineers on the work of both concerns.

Tenn., also have just started development plans to double their capacity. Massasoit Mfg. Co., Lake Charles, La., also established a plant. The Viscose Company made considerable extensions to their Virginia properties.

Commercial dyeing and finishing was extended further by the formation of the Gossett Dyeing & Finishing Company, at Anderson, S. C., the Thies Dyeing & Process Co., at Belmont, N. C., Central Franklin Process Co., Chattanooga, Tenn., Southern Silk Dye Works, Salisbury, N. C., Southern Dyeing Company, Burlington, N. C.

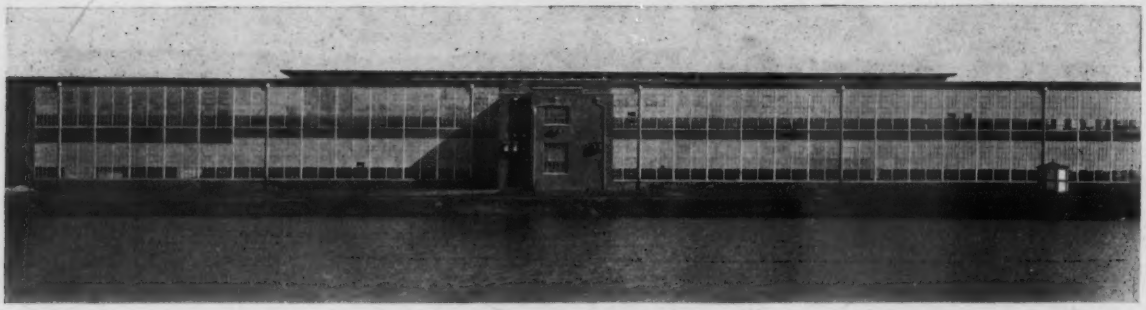
Other new cotton mills, built under the supervision of J. E. Sirrine & Company as engineers, included the Lad Lassie Mills, Anderson, S. C., S. Slater & Sons, Marietta, S. C., Southern Brighton Mills, Shannon, Ga., The Lonsdale Co., Seneca, S. C., Ninety-Six Cotton Mills, Ninety-Six, S. C., Magnolia Cotton Mills, Magnolia, Ark. Substantial additions were made or announced under the direction of this firm at the Jennings Cotton Mills, Lumberton, N. C., Greenwood Cotton Mills, Greenwood, S. C., Arista Mills Co., Winston-Salem, N. C., and North Carolina Finishing Co., Yadkin, N. C.

In addition to the mills described, Robert & Company, Inc., Atlanta, Ga., supervised the engineering work on the following new mills, among other activity; Martha Mills, Thomaston, Ga.; Seaboard Silk Mills, Elberton, Ga.; Morrilton Cotton Mills, Morrilton, Ark.; Muscogee Mfg. Co. No. 6, Columbus, Ga.; Valley Mills Rug Plant, LaGrange, Ga.; Opp Cotton Mills, Opp, Ala. The Unity Cotton Mills, LaGrange, Ga.; Bibb Mfg. Co., Macon, Ga.; American Textile Co., Atco, Ga., and Swift Spinning Mills, Columbus, Ga., Langdale and Riverdale (Ala.) mills of the West Point Mfg. Co., have made or are making extensive additions under the direction of this firm.

Lockwood, Greene & Co., Inc., were engineers on a number of other new plants, including the Phoenix Mills, Statesville, N. C.; Scandinavia Belting Company, Charlotte, N. C.; Mills Mill, Woodruff, S. C.; Dundee Textile Co., Lynchburg, Va.; American Bemberg Corp., Johnson City, Tenn.; American Glanzstoff Corp., Johnson City, Tenn.; as well as additions to the Gainesville Cotton Mills,

Morrilton Cotton Mills, Inc., Morrilton, Ark.

The new mill of the Morrilton Cotton Mills, Inc., Morrilton, Ark., is an example of the growing textile industry in that state. It represents the removal of equipment from Groveville, N. J., by Morris & Company, for the manufacture of heavy ducks, etc. Ellis T. Gurry is manager. Robert & Company, Atlanta, are the engineers and architects.



Valway Mills, LaGrange, Ga.

This view shows the most recent addition to this subsidiary of the Callaway interests, at LaGrange, Ga., where high grade rugs using cotton and jute combinations, as well as cotton wiping cloths are produced. This industry has diversified into other products, such as golf trousers, overalls, etc. Robert & Co., Atlanta, handled the engineering work in this expansion.

Gainesville, Ga., Joanna Cotton Mills, Goldville, S. C., and others.

Connecticut Mills Co., Danielson, Conn., established a 30,000-spindle mill at Decatur, Ala., for tire fabric manufacture. Cannon Mfg. Company, Kannapolis, N. C., erected an additional 50,000-spindle unit. The Trion Company, Trion, Ga., finished a 22,000-spindle addition, and the Lincoln Mills of Ala., Huntsville, Ala., constructed an additional unit.

There were a number of specialty weaving mills built, most of them involving the manufacture of cotton and silk and rayon combination fabrics. These included the Alamance Novelty Mills, Holt, Love & Holt, and N. C. Silk Mills, all of Burlington, N. C.; Dainty Maid Silk Mills, Union, S. C.; Goldsboro Artistic Weaving Co., Goldsboro, N. C.; Liberty Fabrics Corp., Union, S. C.; Silk Mfg. Co., Martinsville, Va.; Buena Vista Silk Co., Buena Vista, Va.

Other specialty plants included the Vogue Mills, Gaffney, S. C.; Saluda Towel Mills; Holliston Mills, Kingsport, Tenn.; Lambeth Rope Corp., Charlotte, N. C.; Crompton Co., Waynesboro, Va., and Howard Silk Mills, Mebane, N. C.

Galvez Cotton Mills, Galveston, Texas; China Grove Cotton Mills, China Grove, N. C.; L. H. Gilmer Co., Shreveport, La.; Warlick Mfg. Co., Newton, N. C.; Roseboro Cotton Mills, Roseboro, N. C.; Belmont Fabric Corp., Belmont, N. C.; Columbus Cotton Mills, Columbus, N. C.; Bowie Cotton Mills, Bowie, Texas; Boger & Crawford, Lincolnton, N. C.; Carolina Fabric Co., Laurel Hill, N. C.; Valley Cotton Mills, Harlingen, Texas; Pinoca Mills, Charlotte, N. C.; Maysville Cotton Mills, Maysville, Ga.; Chadbourn Cotton Mills, Chadbourn, N. C.; Bungalow Rug Co., Scottsboro, Ala.; either built new mills, added new plants or announced plans in this direction.

Notable additions involving construction work for cotton manufacturing or finishing were made by the following concerns: Bibb Mfg. Corp., Columbus, Ga.; Willinca Cotton Mills, Marietta, Ga.; Dilling Cotton Mills, Kings Mountain, N. C.; Excelsior Knitting Mills, Landrum, S. C.; Kenneth Cotton Mills, Walhalla, S. C.; Hall-Kale Mfg. Co., Troutman, N. C.; Jackson Mills, Iva, S. C.; Oneida Mills, Graham, N. C.; Brown Mfg. Corp., Concord, N. C.; E. M. Holt Plaid Mills, Burlington, N. C.; Rowan Cotton Mills, Salisbury, N. C.; Kesler Cotton Mills, Salisbury, N. C.; Rhodes-Rhyne Mfg. Co., Lincolnton, N. C.; Ware Shoals Mfg. Co., Ware Shoals, S. C.; Acme Spinning Co., Belmont, N. C.; Statesville Cotton Mills, Statesville, N. C.; King Cotton Mills, Burlington, N. C.; Cabarrus Mfg. Co., Concord, N. C.; Arcadia Mills, Arcadia, S. C.; American Net & Twine Co., Blue Mountain, Ala.; Athens Mfg. Co., Athens, Ga.; Patterson Mfg. Co., China Grove, N. C.; Halifax Cotton Mills, South Boston, Va.; Dallas Mfg. Co., Huntsville, Ala.; Appalachian Mills, Knoxville, Tenn.;

(*Continued on page* 1218)

The Lonsdale Company, Seneca, S. C.

This company, headed by the Goddard interests of Rhode Island, acquired The Seneca Company's properties and enlarged them by the addition of a 40,000-spindle, 1,000-loom unit, a portion of which is shown in this illustration. Considerable machinery was removed to Seneca from the East to equip this extension. The engineers for this work were J. E. Sirrine & Co.

Warp Preparation Slashing and Weaving.

A Discussion by the Operating Executives of Georgia.

The Fall meeting of the Textile Operating Executives of Georgia, usually devoted entirely to slashing and weaving, was held at the Henry Grady Hotel, Atlanta, on Tuesday, September 13th, and this time included the general subject of warp preparation in the discussion.

At the election of officers, Frank S. Dennis, manager and superintendent, Consolidated Textile Corporation, LaFayette, Ga., was named general chairman, succeeding John S. Bachman, of Rome, Ga., whose term expired. J. W. Hames, superintendent of the Exposition Cotton Mills,

Frank S. Dennis, Elected General Chairman.

Atlanta, succeeded Mr. Dennis as vice general chairman. Frank E. Hymer, superintendent, Eagle & Phenix Mills, Columbus, was elected to the executive committee to fill the unexpired term of Mr. Hames, and E. H. Rogers, agent, Fulton Bag & Cotton Mills, Atlanta, succeeded R. J. Jennings, for a full term, Mr. Jennings' term expiring with this meeting. Robert W. Philip, secretary and treasurer, was re-named to this position.

The meeting was opened by the secretary, in the absence of the general chairman, and after a few preliminary remarks, the chair was turned over to Vice General Chairman Dennis, who called upon Frank K. Petrea, of Columbus, for the invocation.

Mr. Dennis then announced that the scope of the meeting had been extended to include the subject of warp preparation, as well as slashing and weaving. Mr. Philip pointed out that the previous meetings had omitted this department of the mill, and explained the purpose of including it as planning to describe the newer developments in high speed winding and spooling and warping, and the use of fiber spools—these descriptions to be based on Georgia mill installations. The committee felt, he stated, that it would be interesting to have these new processes explained, and the first installation discussed was that of the Universal system of high speed winding and warping at the Lanett Mill of the West Point Mfg. Company, West Point, Ga., the description being given by R. J. Jennings, as follows:

The Universal System of Warping.

"We are installing in our mill the Universal system of high speed warping from magazine cone creels. We do not have the entire mill changed over as yet, but we have about half the equipment installed and have a pretty good idea as to the effect of this system on our mill both in the warping department and in the slashing and weaving. The yarn is delivered to the winders on filling wound bobbins. The winders operate at a constant yarn speed of about 500

J. W. Hames, the New Vice General Chairman.

yards per minute and wind the yarn onto a wooden cone. This cone when full contains about four pounds net yarn and there is a short length of yarn wound in a groove on the outside of the traverse to be used in tying from one cone to another in the creel. When our mill is completely changed over, we will have 19 winders of 96 spindles each handling the production of about 40 spoolers. These 19 winders will require about 70 winder tenders, there being 3 and 4 operators per winder depending upon their efficiency. All our winder tenders use Boyce weavers knotters. On our spoolers, we used about 85 spooler tenders.

"The full cones of yarn are carried to the warper creels on racks, which prevent injury to the yarn in handling between the two processes. In the creels there are two

cones to each running end. Both of these cones are in line with a disc tension and one of the cones is constantly being emptied by the drawing of the yarn over the end of the cone through the tension and to the warper. The bottom end of this cone which is delivering to the warper is tied across to the outside end of the other cone of yarn which is in line with the same tension. When this operating cone becomes emptied, the end automatically transfers to the full cone, and the empty cone is then removed by the creeler, who replaces it with another full cone and ties the transfer end from the bottom of the running cone across to the outside of the full cone. In this way the creeling operation is entirely separate from the warping operation, and the warper is never stopped for the purpose of creeling. This gives a continuous operation of the warper except for the piecing up of broken ends and doffing of full beams. Since there is no stopping of the warper to creel, there are no knots to be pulled through and cut off, which saves a certain amount of waste formerly made under the old system of warping from spools. Another advantage of this type of warping is that there is no limit from the creel standpoint as to the length of warp which can be run, this being governed only by the number of ends, the yarn number, and the diameter of the section beams. We are using balanced wooden headed section beams with 28-inch heads and this permits us to run longer sets than we formerly ran. With these longer sets there is consequently a saving of waste behind the slashers, since there are fewer beams per week slashed.

"We run our high speed warpers at 300 yards per minute, and when completely changed over, our mill will have 10 warpers. We have estimated that 8 warpers will turn off the production required but the two extra warpers will be installed as a surplus. Four warper tenders will be required for these high speed warpers as against seven warper tenders which were used on 37 old style warpers. Eight creel hands will be required on the new system as against 21 on the old system.

"Before changing to high speed warping we had two spooling and warping rooms with a second hand and other overhead help in each room. Our new system will be installed in one of the warper and spooler rooms, which will release the floor space in the other room for other purposes and will also eliminate one second hand and other overhead help from our payroll. Our saving in floor space will be about 40 per cent.

"The wooden cones used on our winders are about one third the cost of spools. They hold about three times the amount of yarn contained on a spool and we find that about 13,000 wood cones are required for our mill under the new system as against about 50,000 spools which we had under the old system. These wood cones are returned to the winders entirely free of yarn, which releases a considerable amount of yarn formerly tied up on the bottoms of the spools. We estimate that our saving of yarn in process in this department will be about 50 per cent.

"We have found that the beams from our high speed warpers show a distinct improvement over the beams from the old warpers on our slashers, and the fewer number of lost ends and draw backs on the sets made from the new beams is noticeable. We have made tests in our weave room comparing the warps from this high speed system with the warps from the old system and we find that there is a noticeable improvement in the running qualities of these new warps.

"In conclusion, I would say that the principal features of this system of high speed warping are: Improved quality of warps, due to uniform tension on the ends and retention of elasticity in the yarn; elimination of all piece spools and dead yarn from bottoms of spools; use of filling wind in connection with winders; savings in labor costs; saving in floor space; less yarn in process; and elimination of spools from our equipment."

The meeting was thrown open for discussion of the system, and Mr. Heymer asked what yarn numbers were run, and how many spindles each winder tender handled. "We run 14s warp, and the winder girls look after 32 spindles each," replied Mr. Jennings.

"Well," asked Mr. Heymer, "do you find on the high speed, running 300 and 500 yards per minute, that there is any more exertion on the yarn; or do you still retain the elasticity in it?"

"Oh, yes, we hold the elasticity," Mr. Jennings answered. "If anything, we find the yarn better."

"Do you get as much yarn on the beams; in other words, in case you should have had a 24-inch beam with 1,500 ends, could you get the same amount of yarn?"

"We can get a little bit more," said Mr. Jennings.

"How does the waste behind the slashers compare with this waste on the old system?" asked Mr. Hames.

"Beam for beam," said Mr. Jennings, "it is about the same, but by getting more yarn on the beam than we formerly put on, and cutting down on the number of sets slashed per week, we have a big saving there; and also, on these warpers, you get very much better run-outs than on the old system."

"In transferring from one of the cones to the other in the creel," asked Frank B. Williams, of Fairfax, "is there any chance for losing twist in the tail-end?"

"There is no chance at all," said Mr. Jennings. "Before it is transferred, the yarn is wrapped around the groove in the cone and run into the slot, and that is held tight until the creeler hand pulls it off."

Someone asked whether weaver's knots were used in the creel, and Mr. Jennings replied they had but recently begun the use of the weaver's knotter for this purpose. Mr. Heymer asked about the wooden head beams, and Mr. Jennings replied that so far their experience with them had been entirely satisfactory, with none to break or warp.

"Why do you use the wooden head beam?" asked John Klinck, superintendent, Sibley Mfg. Co., Augusta, Ga.

"You can't use an iron head beam on the high speed warper," replied Mr. Jennings.

"Then it is a question of the weight of the beam?"

Mr. Klinck asked whether anyone had tried using the magazine creel idea directly behind the slasher, but none replied in the affirmative.

Barber-Colman System of Warp Preparation.

The next system described was the Barber-Colman system of high speed spooling and warping. M. M. Trotter, Jr., manager, Manchester Cotton Mills, Manchester, Ga., was assigned this subject, and in his absence because of illness, V. J. Thompson, superintendent of the mill, presented it.

The Barber-Colman system, Mr. Trotter explained in his description, was designed primarily to spool from a warp wind bobbin, though his mill has no trouble spooling combination wind—that is, warp yarn spun with a warp heart

and filling let-off—rebuilding the hearts to get the wind desired. The bobbins are poured in troughs on either side of the spooler frame, the frames having 100 spindles each. The spooler hand takes the end from the bobbin and pulls it back into a groove. The traveling head of the machine contains the knotting mechanism. This head travels around behind the spooler hand and ties the thread on the new bobbin in a weaver's knot to the thread on the unfilled cheese, the cheese being the yarn package so named on account of its shape. The cheese is wound on a drum, and if the thread breaks the cheese is thrown forward to be picked up by the traveling head on the next round; the defective bobbin being sent back on an endless belt to a tray at the end of the frame.

"We run in our mill an average yarn number of about 13s, and on the old type spoolers we put about 13,000 yards on a spool. With the Barber-Colman spoolers we put about 17,000 yards to the cheese. The bobbins which are thrown out before all the yarn is wound off go back to the tailings machine which takes these short pieces and re-winds them. The four automatic spoolers which we have take care of the same production on which we formerly used nine of the old type spoolers. The new frames require two hands each, or a total of eight hands, against 27 hands on the nine old spoolers. Further, the weavers' knots, as you all know, improve the work tremendously in the weave room.

"After the cheese cores have run full they are placed on what is called a trident, which is a rack with three spindles, each spindle holding four cheeses, or twelve per unit. The spooler hand replaces each full cheese with a partially filled cheese core which we call a starter. The twelve full cheeses are then ready for the warpers. Much less time is required for creeling the warp by this method, but men are used for creeling where girls used to creel the old type spool.

"We have two Barber-Colman high speed warpers, taking the place of seven of the old type, and still have some warping capacity to spare. These warpers are running something over 500 yards per minute, where we used to run with the old type warper 60 yards per minute. You will, therefore, readily see that with 4,000 yards additional in each creel and approximately eight times the speed there is a tremendous advantage in getting a new set to the slashers, which is more important now than in former years, as orders in our case are usually small and quick delivery is wanted.

"The warpers have electric stop motions and a brake on each cheese. These devices prevent the tangling of the yarn when a break stops the warp, even though the speed is very high. The warping is done under a natural tension, or, we might say, practically without tension, and though I have no figures we are satisfied that our work is improved due to leaving most of the natural elasticity in our warp yarn.

"We find that the new equipment not only enables us to begin deliveries quicker in case of new patterns, but gives direct savings in labor and in improved weaving quality. As information, the equipment we have will tie weaver's knots in yarns from 6s to 20s. We run some coarser yarns, but we have to spool and warp them on the old type equipment."

In response to questions from the floor, Mr. Thompson said that while the repair bill on the new equipment was a little higher, the fact that a smaller number of machines was required would undoubtedly equalize this feature. He uses the same operatives and fixers on the newer system who operated the old style equipment, declaring that more skilled help had not seemed necessary. He reported a test on loom stops in the weave room on a 92x64, five-harnessed goods, showing on 10 looms for 20 hours a total of 144 stops on the old style, and 89 stops with the new equipment.

Vulcanized Fiber Spools in Warping.

The third feature of this part of the program—that of the use of vulcanized fiber spools in the regular process of spooling and warping—was discussed by Frank E. Heymer, superintendent, Eagle & Phenix Mills, Columbus, Ga., who stated that he had begun installing them several months ago.

"From the expressions from our warper tenders, who certainly know whether the work is running better or worse, I judge this is one of the biggest improvements we have ever put in the mill," said Mr. Heymer. "Heretofore, with two warpers that was all they could handle. Since using these spools we have fifty per cent decrease in yarn breakage on the warpers, we are getting a uniform beam for the beam-dyeing machine, and we do not have the hard places we had formerly that would make streaky beams and the soft places which would also cause trouble. You can imagine what that means in a colored mill. We have found we get a more uniform, more even dyeing, and better running work, and the warper hands are much better satisfied, they are running three warpers now. We have made no other changes whatsoever that would affect this."

Mr. Hames asked Mr. Heymer whether he gets any more yarn on the spools, and the reply was that "we get two beams from a creel where we got one heretofore."

Slasher Roll Weights.

This concluded the discussion of warp preparation, and Mr. Dennis assumed charge of the technical discussion of the questionnaire on slashing and weaving. The first question taken up was: "What weight squeeze roll do you use on slashers for various numbers of yarn, with varying number of ends to a set?"

Mr. Dennis explained that the question was so worded to distinguish between mills running a light sheet of warp, and those running a heavy sheet of yarn, which is more difficult to penetrate with the size and therefore might require a different weight squeeze roll to that which could be used on a light sheet. He read some of the answers submitted in response to the questionnaire. One said, "On all numbers of yarn, with a varying number of ends, we use 480 pound front roll and 350-pound back roll."

Other reports furnished, either in answer to the questionnaire, or from the floor at the meeting, showed the following practices as regard squeeze roll weights:

Mill	Weight of Back Roll	Weight of Front Roll	Average Yarn No.	No. of Ends in Warp
B	300 lb.	450 lb.	4s to 16s	1,300 to 6,020
C	450 lb.	500 lb.	24.50s	3,500
D	325 lb.	450 lb.	14s	2,000 to 5,400
E	500 lb.	.....	24s	3,600
F	250 lb.	410 lb.	30s	1,200 to 2,800
G	360 lb.	.....	4s to 18s	2,000 to 6,000
H	400 lb.	.....	12s to 17s	1,900 to 2,540
I	350 lb.	.....	12s to 26s	1,464 to 4,000
J	450 lb.	.....	7s to 22s	1,200 to 2,600
K	350 lb.	.....	15s to 24s	2,016
L	450 lb.	470 lb.	13s	2,100
M	260 lb.	475 lb.	.....	....
N	350 lb.	450 lb.	7s to 22s	2,400

Where only one roll weight is given in the foregoing table, it is assumed that this weight is used for both rolls, Mr. Dennis explained.

The chairman brought out in connection with the reply of a 360-pound weight for 4s to 18s, that the superintend-

ent had added that "we have purchased 500-pound squeeze rolls as we have found we get better results with heavier rolls."

"Does the squeeze roll squeeze the size out of the yarn or does it squeeze it into it?" asked D. R. Senn, of the Enterprise Mfg. Co., Augusta, Ga.

"Has anybody tried a rubber squeeze roll; if so, what is the objection to it, if any?" inquired John Klinck, of the Sibley Mfg. Company. Mr. Klinck said he had intended trying this out, as it seemed to have some features in his mind, but had never had the nerve to do it because he had never received any encouraging support in the idea; somebody must be the goat, however, he said, later, and he intends reporting on this experiment at a subsequent meeting.

Mr. Dennis presented the question of Mr. Senn by asking, "Do you get more size in the yarn with a heavier roll, or less size?" W .H. Epps, superintendent of the Jefferson Mills, Jefferson, Ga., inquired why the superintendent quoted had changed to the 500-pound roll. Frank L. Asbury, Jr., superintendent, Hillside Cotton Mills, LaGrange, Ga., stated he had made that response, declaring that "we had one 500-pound roll, and by using it found that the yarn was better, with a better size penetration, making a smoother coating. It is just like a woman ironing with a light or a heavy iron and pressing or not pressing down on it with weight. We run from 4s to 18s and we have ordered the 500-pound roll for all of our slashers."

"Did you decrease or increase the weight of the yarn by the amount of size put in?" asked the chairman.

"We did not test that," said Mr. Asbury, "as from observation it made a better sheet of yarn."

"Is there any difference in the shedding at the loom?" Mr. Dennis inquired.

"I cannot give you figures," answered Mr. Asbury, "but I think it would shed less, because with the heavier roll we make it penetrate the yarn better.

"What kind of work was that on, and what kind of blanket do you use?" inquired Kenneth McKenzie, of Whittier Mills Company, Chattahoochee, Ga.

"On both white and colored work, using an all-wool slasher blanket," answered Mr. Asbury.

C. T. Hughes, overseer of weaving, Hillside Cotton Mills, discussed this subject.

"There has been quite a discussion on size rolls, heavy and light," he said. "In my judgment it depends on the kind of weave a fellow is running. If he runs a coarse light weave he doesn't mind having his yarn rough and 'jacketed'; that is what you get from a light squeeze roller. The diameter is so small that when it runs on the copper roll the size slips through. Now, if you are running high counts—it matters not so much about the number of the yarn—if you are running say an 118x72, 18s warp, you must put the size *in* the yarn. By using a heavy roll you get a better penetration, and a smoother yarn, and a finish that will not peel off provided you use enough blanket. You must use more cushion; the more cushion, the more surface, and that gives you more of the ironing surface effect." Mr. Hughes described his method of applying blankets, stating that he trims the blankets twice; he takes it out and uses the one from the back to the front, putting this blanket on first and then using 4½ yards of new blanket, on the 500-pound roll. He said he finds they get a smoother, evener penetration on the high count sley.

Overcoming Slasher Waste?

The second question asked was, "How do you overcome slasher waste?" Reading the answer, Mr. Dennis said one mill had taken this literally and answered, "We don't, but we weigh behind each slasher man and keep a record. Another mill said, "We overcome slasher waste by watching the little things." Another suggested "Running section beams right on warpers, pulling broken ends when a set runs out through to the front before removing lease rods, and using three pieces of gum paper instead of two on the loom beams."

Giving his own method to start the discussion, Mr. Dennis said, "We weigh behind each set, on each set of yarn run there is a complete report showing the pounds of raw waste, pounds of hard waste, percentage of weight added to yarn, etc. We know the number of beams to the set, and in that way we roughly calculate the average weight of the waste per beam, We like to get under a pound to the beam, on 26s and 32s warp. I heard one man say in the executive committee meeting last night that he averages, on coarser numbers than ours, about .6 pound per beam."

"How many keep an accurate record of their slasher waste?" the chairman asked.

"The way we do," said Mr. Steele, superintendent, LaFayette Cotton Mills, LaFayette, Ga., is this. The custom was when the first end broke on the first beam the slasher tender would pull the lease rod, and all that good yarn behind was waste. The way we work ours now is, we run the broken ends through and do not stop the first end that breaks. We let them all break out until they go through the lease rods and then we pull the rods. We make a half pound and less per beam, on 24½s yarn, 3,600 ends to the beam.

"The slasher waste also depends on the way the warpers are set. We try to see that there are no loose ends coming up on the warpers and no laps at the slasher. We have reduced our waste on the loom beam by using three pieces of tape instead of two. That is, put the two pieces of tape on ordinarily, and then roll down one turn of the front roll on the slasher and put on another piece. When you cut the piece off, do not let the loom fixer cut the warp out until that piece of tape shows up. We have reduced our waste in weaving about one-half."

"Do you break in to save the pattern?" was asked.

"We let it run out," replied Mr. Steele.

"Has anybody changed from warpers measuring from the measuring roll to measuring from the drum?" asked the chairman. "Is there any difference in the run-outs by making that change? Which will give the best run outs?" No one answered this question except Mr. Thompson, who said "We get a better run-out from the drum than from the old type," the chairman explaining that a good many of the newer warpers are equipped to measure from the drum.

Moisture in Warps.

The next question read, "What is the best method of determining the proper amount of moisture to be left in the warp when it comes from the slasher? What is the best method of determining the amount of moisture which is actually left in the warp?"

The chairman reported that most of the replies to the questionnaire indicated some rule of thumb method by which the proper amount of moisture to leave in the yarn was estimated. Some people, he said, go by the feel, some

watch the steam as it rises from the yarn on the small cylinder; one man said the warp "must come off cool," etc. He asked for those present to describe their different methods. "We have temperature controls on the slashers and go by that altogether," said Mr. Senn, of the Enterprise mill. "We leave 6½ to 7 per cent moisture in the yarn. We weigh a sample of yarn, bake the moisture out and weigh it again, and I am practically certain we leave 6½ to 7 per cent in it. When we arrive at what we want, we set the slasher speed and temperature for that amount."

"Do you find that gives you the best results?" asked Mr. Dennis, regarding the percentage. "We are still experimenting on that," said Mr. Senn. "We got all balled up on the size mixture; we were making a mix trying to save on materials, and I found out we couldn't do that. Shortly after we started the temperature controls, I noticed that the yarn felt rough, and finally, I talked to the slasher man about it, and he didn't know what was causing it. I thought if we left the moisture in there it ought to feel soft. Then I noticed streaks on the cylinder. The slasher man couldn't tell me anything about it, and I went to the spinner, who has charge of the slashing, and when we discovered the trouble it was due to the high-grade, closely-woven, all-wool jacket we were using on the rolls. We got some that wasn't so closely woven and the streaks disappeared. That is why I asked the question a while ago about whether the roll squeezes the size in or out of the yarn. I contend that it squeezes it out. I think you get the penetration from the heat."

"One of the safest rule of thumb methods I have known was given by one of the men in answering the questionnaire," said Mr. Dennis. "This is: watch the steam as it leaves the small cylinder, and when the yarn in the back comes off if there is still a small amount of steam leaving the yarn, we figure there is practically no chance of that yarn's baking. We also believe if there is no steam rising on the small cylinder, the yarn *is baking* during its long contact with the cylinder."

Mr. Heymer explained a simple method he had learned during his apprenticeship, that of feeling the yarn after wiping the hand dry; if there is any moisture on the hand, he believes there is sufficient in the yarn to make it weave with elasticity.

"Does anyone go by the pressure gauge?" asked the chairman, but there was no response to this query.

The fourth question was, "What kind of size pumps do you use, low speed rotary, plunger, etc.—and do you have trouble with size leaking around the stuffing boxes on these pumps? If so, give some of your remedies.

Mr. Dennis said the majority of those reporting said they used the rotary type pump, with very little difficulty with leaking. One man reported overhauling the pumps once a year.

"What success do you get out of using a heavy cotton blanket on slashers as a filler for slasher flannels; weight about 3.00-yard?" This was the next question on slashing.

John Klinck said that on indigo dyed warps, he uses a cotton blanket on the back roll entirely, and a mixture of wool and cotton on the front, since because of the alkali in this yarn the use of an all-wool blanket is impossible. Here, he said, is where he wants to use the rubber roll if he can get up nerve enough to do it. He said he puts the cotton sheeting on, then the burlap filler, and then about six yards of the cotton over that.

Mr. Dennis, in explaining the question, brought out that undoubtedly the man asking it knew that this was rather common practice. That the cotton filler is essential to keep the moisture from the iron part of the roll and in that way prevent rust; as well as the fact that it is necessary at intervals to smooth up the roll on the lathe and re-lead it and cover it again with the cotton sheeting. Some of the answers he read, as to the advantages of using the blanket underneath, follow:

"This gives us a longer life on the flannel, and we get a smoother and better feeling yarn."

"We form a cushion for the squeeze roll and do not take any chances on flattening out the yarn."

"Does anybody run the beams all the way over the top instead of winding around the different beams in the creel?" asked Mr. McKenzie.

"We run ours all over the top," replied Mr. Thompson.

"Why do you do that?" asked Mr. Hames.

"I claim the slasher tender has more control over that waste proposition you were talking about," said Mr. McKenzie.

"We have less waste when we run them over the top," said Mr. Thompson, "each beam has the same tension on it. We do it with a special arrangement. The yarn goes over a ball bearing roll. When an end gets tight it releases the friction on that beam. We do not have any trouble with any of the beams running out ahead of the others."

"How do you cut the laps off?" somebody asked.

"The frames are high enough so you can get under them," said Mr. Thompson, who added, in response to a question from D. S. Cook, agent, Pepperell Mfg. Co., Opelika, Ala., that if he did not have the special arrangement he would not run all of the beams over the top. Mr. McKenzie brought out the fact that all Scotch tape dressing is always run over the top.

Size Mixtures.

"Does anybody use a combination of corn and potato starch?" asked Mr. Thompson.

W. B. Dillard, Jr., assistant superintendent, Columbus (Ga.) Manufacturing Company, said they use 25 per cent potato starch and 75 per cent corn starch, this practice being reported also by Mr. Epps of Jefferson. Mr. Dilliard said this gives a better feel and better strength than does straight corn starch. There is no difference in the shedding that he could notice, he added.

"Thick or thin boiling starch?" asked Mr. Hames. Mr. Dillard said he uses the former, while Mr. Epps said he utilizes thin boiling starch.

"What numbers and what is the object of the potato starch?" was asked by Mr. Hughes.

"We are on 24s warp, and we use the potato starch on account of the feel," responded Mr. Dillard. "It gives more elasticity in the weaving, and we feel that the potato starch penetrates a little bit better."

"We get a better breaking strength on our yarn, and it feels a whole lot better," added Mr. Epps.

To round out the discussion, Mr. Heymer reported on the use of tapioca starch.

"Four months ago," he said, "I made an experiment using 25 per cent tapioca starch and 75 per cent thick boiling pearl starch. My object was to get a better feeling warp. In that connection, I would like to ask if anybody has tried using thick boiling starch by using a reducing

agent such as Arey. I have tried that with a very small amount, and by using tapioca and thick boiling corn starch we have a wonderful improvement in the conditions in our weave shop. We get a better feeling warp and better penetration. Our weaver, Mr. Stevens, is here and can speak for himself as to his production. I am very well pleased with the trial, and I have since adopted it."

Mr. Dennis asked whether anyone had tried a blended starch of sago and corn or other combinations, but there was no further discussion. The meeting then went into the

Weaving Discussion.

The first question brought up was, "What causes a loom to make shuttle marks and keep running?" Mr. Dennis explaining this referred to the bobbin-changing loom only.

Among the answers returned giving the causes of this difficulty were the following:

"Filling breaking or fork out of fix."

"Filling breaking and catching up again or filling catchers not set up right."

"Shuttle feeler set wrong, bunch too high, bad piecing in spinning."

"Most common cause is where the filling breaks and then catches up before the filling fork has time to operate. Also bad bunches on the quills will cause this. Some of the causes for filling breaking are too much friction in the shuttle, quills being crooked in the shuttle and loose shuttle springs allowing the quill to wabble about."

"The temple being set too deeply, the temple knife hanging on a worn temple screw, a worn cam point, not getting enough power from the handle end of the loom, worn front box leathers, loose lay plates, shuttle spring too low or too high, and weak yarn."

"Filling breaks and the filling fork getting tied up."

"Weak places in filling, bobbin loose in shuttle, bobbin not pointing to center of shuttle eye and a great many other causes."

"A dirty shuttle box very often causes shuttle marks to show on the cloth, especially if the shuttle is much worn and the filling yarn gets pinched in between the shuttle and the dirty side of the box or binder."

"One of the filling forks not being properly set will keep a loom running."

Rules for Oiling Looms.

The chairman asked the next question, "What is a good rule for oiling looms?" He read the following answer: "Should oil daily: pick cams and balls, pick shaft bearings, crank arms, crank shaft bearings, rocker shaft boxes, cam shaft bearings, auxiliary shaft boxes, harness cams, idle gear studs, treadle roll pins, friction pulley parts. All other parts should be oiled twice a week."

He next called attention to the oiling chart for Northrop looms needing frequent oiling, as published in the August, 1927, issue of "Cotton Chats," by the Draper Corporation. It was announced that this schedule, prepared in the form of an automobile oiling chart, would be furnished by the Draper Corporation to any mill man desiring it. Mr. Dennis read the following schedule from this chart:

Oil Every Day: Pick cams and balls; pick shaft bearings; crank arms; crank shaft bearings; rocker shaft boxes.

Oil Every Two Days: Cam shaft bearings; auxiliary shaft boxes; harness cams; idle gear stud; treadle roll pins; filling cams and followers; protector rod bearings; friction pulley parts.

Oil Every Three Days: Shipper parts (if friction pulley); treadles; shuttle feeler bushing; other shuttle feeler parts; oscillator cam follower; other knock off parts; take-up roll bearings; transferrer.

Oil Once a Week: Loose pulley and shipper parts; lay guide; fork slides; starter rod bearings; takeup parts; spring shaft parts; let off parts with beam and whip roll bearings; harness roll bearings; Lacey top; warp stop motion parts (upper); parallel stud and spring; bobbin disc and pawls; bobbin support.

Grease Once a Week: All cut gears; parallel tongue; temple thread cutter; temple bar; cutter spring and stud; shuttle feeler cam path.

Occasionally: Drop of oil on filling motion shipper bushing. Let off internal gear and pinion and path of hub of controlling lever link—grease, but do not get any on friction leathers. Wooden harness sheaves—clean when warp is out and put grease on studs and between sheaves.

It was explained in "Cotton Chats" that this set of oiling rules was made up for a mill on coarse weaves with heavy shedding of lint and waste, and that such looms need the most frequent oiling; while at the other extreme some looms require oiling only a half or even a third as often as the chart shows.

The Use of Weaver's Knots.

The final item on the questionnaire was, "What advantage have you found in the weaving department by using warps tied with a weaver's knot instead of the regular knot? What difference in the quality of the work, loom stoppage, production, etc?"

Mr. Dennis read an answer replying, "Great improvement." Another said, "We find that the loom stoppage is not as great on warps tied with weaver's knots as on those tied with the regular knots." Another answered: "Smoother cloth, stoppage less, and production increased at least two per cent."

Mr. Dillard said his loom stops per hour per loom have improved eight per cent by using the weaver's knot. Mr. Dennis read another response: "Fully five per cent reduction in loom stoppage, in some cases we would find as much as 15 per cent reduction in loom stoppage, and the reduction in loom stoppages automatically increases the percentage of first quality goods."

"Has the production shown the same increase?" asked Mr. Hames of Mr. Dillard.

"We have a very hard weave on which we run tests, and if the different processes show up satisfactorily on that hard weave we consider it as an extreme to go by, and that is where we arrived at the eight per cent reduction in loom stops," replied Mr. Dillard.

"I have never taken any percentage figures, but I believe our production increased about three per cent," declared Mr. Steele.

"Can the weavers take more looms or do more work, by using the weaver's knot?" asked Mr. Hughes of Hillside.

"No, the weavers run the same number of looms," replied Mr. Dillard.

This concluded the morning discussion. The luncheon was held at 12:30 o'clock in the main dining room of the hotel, where R. A. Field, general superintendent, Newnan Cotton Mills, Newnan, Ga., received an order for a Fall hat, his name being drawn from the list of those present by Mayor Epps.

At the conclusion of the luncheon, the meeting was thrown open for discussion. The first feature was a de-

scription of the Britton "Sizeometer," by W. R. Widdup. This device is attached to the front of the slasher, and consists of a dial gauge which is operated by the pressure of the sheet of yarn against a nickle-plated split rod that is set in bearings, one of which is connected to the gauge. The purpose of it is to indicate whether the proper amount of size and moisture is being applied to the warp yarn, this being shown by the pressure of the splitting warp against the split rod which in turn moves or varies the position of the needle on the face of the dial. It is marketed by W. J. Britton, superintendent, Spartan Mills, Spartanburg, S. C.

The first question asked came from Mr. Petrea, who wanted to know what caused sweat spots on dark warps on the slashers. He uses wooden hoods, he said in response to a question. Mr. Heymer suggested a 60- or 70-inch fan for drawing the air away, and Mr. Hames said he had secured better results when he located the fan at the end of the row of slashers instead of drawing from each straight up through the roof.

"What causes slasher marks on warps; some people call them blanket marks? They run across the warp in a line or come in spots." This question was from Mr. Heymer.

"I find some of these come from having too much steam on," declared Cliff Barnes, overseer weaving, Exposition Cotton Mills. "Or else the size might be jumping up, which would cause the spots on the warp. Then again, where a line appears across, we call these roller marks, and we would find where the slasher had stopped to cut a lap or had taken too long a time for doffing."

"Does anybody use a strainer in the size line to take out some of the lumps?" asked Mr. Dennis.

"We use a strainer in our return system from our size box on the line before it enters into the storage kettle," replied Mr. Hames. "It would surprise some of you men to know how much we accumulate there." He explained this strainer catches the size from the mixing kettle and also from the size box to the storage kettle. Mr. Dillard said he uses the same system. Mr. Dennis, who asked the question, said he intended trying a strainer located right at the size box.

L. A. Cottrell, of the Swift Manufacturing Company, Columbus, Ga., asked what would cause crooked or rainbow cloth in a 3.00-yard cottonade. He said some of his looms were producing cloth that unrolled in a curve or arc.

Mr. Barnes said on wide sheetings he had taken a loom down and found this to be caused by one Pitman arm being shorter than the other. He also said it would occur if the loom lay and sand roller were not level. Mr. Steele said, "We had a little bit of that trouble and we found one of the crankshafts ahead of the other." "If the cloth roller doesn't come up and down easily it might cause that," added Mr. Barnes.

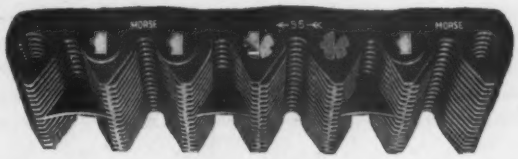
Mr. Dillard said he was using a slasher roll consisting of wound worsted yarn instead of a blanket covering and asked if anyone else had tried it. Mr. Heymer, the only other one discussing this, said he had installed one, but that it had taken so long to install it he did not feel justified in stopping the remainder of his slashers for this purpose. He said it required ten days to equip one slasher at his mill, while Mr. Dillard said at his plant it could be done in thirty minutes.

The final question was from Mr. Steele, who said "if you were making say a 96x64, out of 22s yarn, and decided to change the warp to a 24s, would you have to change the number of the reed to get the width of the cloth?" He said he had had this to do, and had found it necessary to change the number of the reed from 30½ to 30¼ in order to run the warp slack enough to get the width required.

This concluded the discussion, and after some time spent in discussing means of improving the organization's effectiveness, the meeting was adjourned.

Morse Announces Improved Chain.

The Morse Chain Company, Ithaca, N. Y., manufacturers of silent chain drives, have announced an improved chain, the improvements being principally in the design of the rocker joint. This new design, 55 type chain, it is announced, will run on all sprockets, the new links being the same length and height as the old. The new joint operates on the same principle as the original Morse rocker joint. The seat pin, seen at the left of the joint in the illustration, has been enlarged to give greater bearing surface and for strength; the rocker pin, at the right, has been changed in contour for better surface contact with the links—the whole producing a more nearly round hole with reduced clearance, it is pointed out, and gives a stronger, better balanced joint permitting increased tension.



The company also announces the installation of modern automatic electric furnaces for heat treatment of the chain parts.

New Vertical Brushing Machine.

A new patented vertical brushing machine for removing leaf, motes, soft bunches, dirt, etc., from all classes of woven fabric has been developed and is being marketed by the Hermas Machine Co., Hawthorne, N. J. It is especially adaptable, the manufacturers state, to those mills selling goods in the grey, which, while not bleached must be clean, as well as products for the coating trades, etc.

The machine is ball bearing throughout, and occupies a small amount of floor space. It has individual suction on each brush and sand roller. It is vertical, occupying 24 inches of space from front to rear, with a height of 6½ feet, the width being governed by individual conditions. The brushes are readily adjustable for heavy or light contact, and to brush one or both sides of the cloth; all combinations of fiber or wire brushes and sand rollers are provided for. Large doors are provided at the front and rear for making the machine accessible for threading the cloth through. All belts, pulleys and sprockets are fully guarded.

New Link-Belt Promotions.

Frank B. Caldwell has been appointed sales manager of Link-Belt Company with headquarters at the Chicago plant office, 300 W. Pershing Road, and will have supervision over all sales activities in the western division. R. P. Shimmin has been made assistant to the chairman and president, and will make his headquarters at 910 South Michigan Avenue.

Tension in Multiple Winding of Yarns

BY R. A. SONIAMAN.

PART TWO.

Tension devices must be watched with a keen eye, but tension devices alone are not always to blame for uneven tension in ply winding.

For instance, when running fine yarns, especially yarns which shed considerably, it will be found that an occasional dropwire will gather an accumulation of lint to itself. This fuzz acts as a retardant to the normal free movement of the end when the latter runs over it and creates a friction that is at complete variance with its companion ends, and the result is a corkscrewed product resembling in every respect the result produced by a faulty tension device.

It is obviously, then, to the advantage of the firm to have the overseer of the spooling and winding sections train his workers to watch out for, and remove, any waste

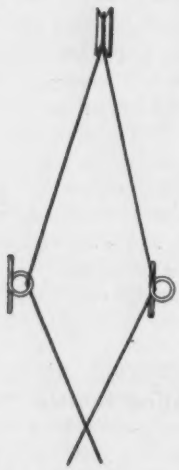


FIG. 1

on the dropwires. Furthermore, the person in charge of the machines should be made to insist on having this rule followed out carefully.

Not only dropwires, but rods, guides, and guide-wires, often have sufficient waste attached to themselves to cause a differentiation in the tension. All parts through which, over which, or under which the end of the yarn passes should be carefully and frequently scrutinized by the workers, and any collection of waste or fly should be removed.

Occasionally, a peculiar, and sometimes unbelievable, cause of uneven tension in ply yarn will be unearthed. The writer recollects one instance where an unevenly tensioned tube of yarn was traced back to a spooler who had left a cleaning rag on her machine in such a way that one of the component ends of the tube ran over it, increasing its friction far beyond normal. Bristile brushes carelessly left about have caused uneven winding in the same way as the rag already mentioned. Obviously the remedy for this is simple. Insist on having rags, brushes and other such articles put where they will not interfere with the winding.

Another recalled case of uneven tension is that occurring on the upright type of spooler—spindle spooler. A fine count was being two plied, and the dropwires were not balancing properly causing considerable annoyance and loss of production and temper to the operative by continually dropping. As it was generally only one out of a pair that gave this trouble, dropping even though the end neither ran out nor broke, the spooler tender crossed the ends as in the illustration, Fig. 1. Number 1 is the wire that had put the end normally running through that wire across to the No. 2 wire, so that the other end which was then passed through the No. 1 wire acted as a sort of support to it. It is needless to say that in addition to furthering eccentricities in tension this practice of crossing the ends was also causing a chafing condition which was detrimental to the yarn. Furthermore there is always a possibility of single being made by it.

A queer example of uneven tension is that brought about by cut dropwires. For instance: assume that 40s has been running on a machine for sometime and that a channel has been worn into the wires. A change of yarn is made, 20s being substituted. This count being of larger cross-section than the 40s will experience a bit of difficulty in passing through the channel. However, this of itself would, perhaps, not cause any particularly outstanding diversity of the tension, but as single yarns are usually of uneven diameter, a state of affairs is brought about in which the thin portions of the yarn run through the cut wire very nicely, whereas the thick parts choke the cuts, and are strained in going through, the effect being to exert so strong a drag on the yarn as to occasion a rupture now and again. As the action is not a uniform one (since the thick and thin places are not uniformly spaced), there is a decided jerky action going on continually which is detrimental to perfect winding. It needs only half an eye to see that any idea of a uniform tension is simply out of the question under the circumstances. Nothing but a renewal of the wires will cure this trouble.

Another curious cause of uneven tension is that in which the dropwires are of different weights because of being of different sized wire. Such a situation usually comes about through the skip-here-and-there-practice of renewing bad wires. A mistaken idea of economy, of saving a wire, or of a bit of time, is generally at the bottom of the trouble. The fixer or section hand discovers that one of the two, three, or four wires in a set is so badly cut that its removal is imperative. Instead of taking out all the wires on that set, or side (which is a better method) replacing them with new ones, and keeping the best of the removed wires for a special side which can then be closely followed up, he simply removes the cut wire. Where this practice prevails it will generally be found that newly purchased wires will be accepted as being of correct size without anyone checking to see if they are really right.

Dropwires should always be measured with a wire gauge to make certain that they are of correct size before they are put on, whether the wires are made up in the machine section of the firm, or purchased already made by some outside concern. Quite frequently where a diversity in the size of the wire is sufficient to cause a dropping of the wires it has been found that the operative will wind the end of yarn a turn or two around the offending wire or some rod over which the yarn runs or if possible she will cross the ends in some way so as to obviate the falling of

the wire. Of course, making a bad matter worse!

In those establishments where a high degree of freedom is desired from bunches, slubs, waste, piecings, fly, and other extraneous and undesirable matter, the yarn is run through some form of cleaning device, slub-catchers, and so on, before it reaches its ultimate spool or package.

Unless continuous care is taken it will be found that the cleaners, because of unequal adjustment, are the source of a variation in tension. To bring this clearly to mind, a glance at the sketch, Fig. 2 will show that a certain degree of friction must be generated with the close setting usually made to clean the yarn. *A* illustrates the proximity of yarn

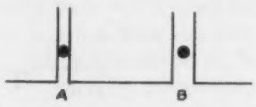


FIG. 2

and cleaner edges in the usual setting; whereas *B* indicates the space that is occasionally found when settings are carelessly made or the winders have an opportunity of tampering with the settings. It must be quite patent that if the ends of yarn from these two cleaners run to the same spool that there will be some difference in the tension.

Since not all the unevenness of a ply yarn or thread can be attributed to faulty tension, it is well when a complaint is received or a suspicion exists about uneven winding to examine the alleged faulty material, and if necessary dissect it. First, by placing it in a twist-testing machine and then, by looking at it through a magnifying glass.

This examination may disclose that a certain roughness

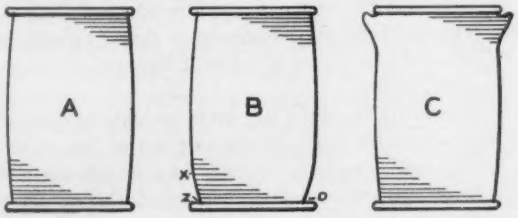


FIG. 3

does exist, saw-tooth like, or perhaps somewhat corkscrewed. Upon closer inspection however, it may be seen that the roughening effect is due to a difference in the width of the coils, and as these thick and thin places are of a sporadic nature, that is, only here and there and not consistently throughout the whole length of the thread, it may be confidently assumed that the trouble is in the single yarn itself. Untwisting and examining of the single yarn will generally prove that this inference is correct.

When, however, the thick and thin places are present throughout the stretch of material in the twist-testing machine it may be assumed that a mixture is at the bottom of the trouble—the greater the disparity between the counts the greater will the uneven appearance show up.

There are still other causes which make for uneven ply winding. One feature of spool winding which favors unevenness is that of imperfectly filled ends. In the accompanying sketch, Fig. 3, *A* is to all practical intents a properly filled spool and should give no trouble as regards uneven winding; *B* has a good upper end but a poor bottom which is bound to cause a rough looking product identical in every respect with that caused by uneven tension.

The reason for this bad bottom causing uneven tension lies in the fact that in winding the several ends that make up the composite one become separated, some falling into the depression at *d*, others remaining on the larger part of the spool. Therefore every revolution of the spool in unwinding causes a larger length of yarn to feed from the point *x* than at *z* which is in the declivity *d*, because of the difference in the diameters of the spool at these two points. The end or ends from the large part *x* will sag as shown in the sketch, Fig. 4, and consequently, the finished thread will be corkscrewed.

The sketch here will serve to make clear why any corkscrewing of the ends in ply winding, any looseness of one or more of them will result in a decrease in the strength of the finished product. If the length in the sketch were to be placed in the jaws of a single thread breaking machine, and the machine started, there would be two ruptures ensuing with quite a space intervening. First, the length *z*

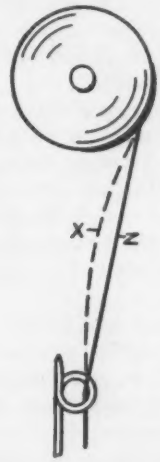


FIG. 4

would break and then the stretch *x*. Naturally there would be a very decided lowering of the standard break because of the fact that instead of there being a homogenious thread to break there are really two threads to break each part of which is weaker than the whole.

The reasoning applied to the effect of a spool like *B* on the winding holds true for a spool filled like *C*, Fig. 3. In fact it is applicable to any spool which has overfilled edges or cut-in edges. Also for those spools that have a ridge on them at any point along the traverse of the spool caused by a cessation of movement of the traversing apparatus.

Small converting shops which try to save cost by eliminating the winding process in their products by plying directly from the twister, often wonder why they are troubled with erratic spells of uneven yarn. Apparently no specific spot or cause can be singled out as the source of the fault. Sometimes the trouble is due to having various sized spools in the twister creel—a system designed to facilitate the replenishing of the emptying spools by the twister operatives. It will be found upon examination that, contrary to expectation, the smaller spools exert a greater drag than the fuller spools. The remedy, of course, is have the set of spools feeding to one bobbin of practically

the same diameter.

Dirty, sticky spool skewers, or skewers that have waste on them, will cause uneven tension because of the excess friction generated by the extraneous matter on the skewers. Cloths, rags, brushes, and other articles used about the twister, if placed so that they come in contact with one of the spools in a set will cause uneven tension.

It should be borne in mind that not all the causes of uneven tension or winding mentioned in this article are serious enough to spoil the product; but they do exist and as they may in time cause considerable loss to the concern it is well to combat them from the beginning. For, frankly speaking, persistent and consistent attention to these details is an absolute necessity to ensure a twisted ply product that will build up the business and the dividends of a firm.

The Combination of Wool and Cotton

BY "FABRIC."

The use of cotton as a substitute in the making of woolen goods, often designated in the market as the cotton carded fabric, requires a careful selection of the proper kind and quality of wool stock to be used, in order to secure the best possible results as to the character and "wooly feel" of the finished fabric.

No less important is the securing of cotton colors that will retain their fullness of shade and freedom from a tendency to run or stain the lighter shades when subjected to the process of fulling.

While cotton may be successfully employed in combination with the coarser grades of wool, in the making of certain kinds of cloth, as crashes, homespuns and the like, to secure a soft and well felted cloth, with the nearest possible approach to the all wool in handle and appearance, the affinity of fibers and the felting quality of the wool stock should be considered, whether it be of virgin wool or reworked stock.

The practical carder and spinner understands the importance of a uniformity of quality, in order to secure perfect yarn; but the advantage gained in the finishing of the cloth, as viewed from the finisher's standpoint, is not so well understood.

Fine Territory, California and merino wools, having fibers more in keeping with the quality of the cotton, insure a mixture that can be spun to almost any fineness usually required, and in the finishing process insures a well felted and soft fabric, such as a coarser grade of stock would render impossible.

The cotton, possessing no felting quality, is covered by the knitting together and coming to the surface of the cloth in the fulling process in proportion to the amount of felt produced.

In addition to the felting quality of the wool, an important advantage is gained by having as short staple as will work well in the carding and spinning, thus insuring a multiplicity of fibers. This gives to the cloth the best possible "wooly feel" and a covering up of the cotton contained in the mixture. It is obvious that the use of a coarser grade of wool would necessitate the spinning of a heavier yarn, which, together with the lack of felting quality, would render it necessary to reduce the width in the loom in order to full to the required finished width, thus sacrificing the desirable handle of the cloth.

The writer was once engaged in the making of a line of 12-ounce suitings, of which the mixture was composed of fine Oregon and California wools and 40 per cent of cotton. The construction of the cloth was as follows: 2592 ends of 4 run warp, laid 70 inches wide in the loom, and 44 picks of 4 run filling, thus giving 16 inches to full in width to secure a width of 54 inches when finished. This produced a cloth that was most desirable as to handle and appearance, as well as to wearing quality, rendered possible by the right combination of stock.

While the wool fibers upon the surface of the cloth were sufficient to produce a wooly effect, the felted condition was not sufficient to obscure the design or color effect, and it was possible to finish without napping, or if desired, to nap for a velour finish.

If a more pronounced wooly effect is desired, it may be secured by applying the traps for fulling in length, being careful not to carry it to a point that will render it difficult to secure the desired shrinkage in width.

On account of the tendency of the dyed cotton to become reduced in shade in the fulling and scouring, it becomes necessary to exercise precautions in order to secure full and satisfactory shades in the finished cloth.

While the wool colors retain their fullness of shade, and are often improved in the finishing process, nearly all cotton colors are reduced in shade by the alkaline strength of the soap and the heat and pressure of the fulling process. Because of this the colored cotton should be sufficiently full in shade to insure a desirable fullness of shade in the finished cloth.

If the wool and cotton are made to match in color as they come from the dyer, the washing out of the cotton in the fulling and scouring will result in a mixed and grisly appearance that will be far from satisfactory. This is especially true as regards solid colors, and care should be taken to have a suitable match of colors when the cloth is fully finished. To secure this result small samples of both the wool and cotton to be combined may be put into a retainer of cotton cloth, and sewed to a cut of cloth and subjected to the regular process of fulling and scouring, and when dried, a comparison will determine if the shade of the cotton is suitable to use. If it should be a shade darker than the wool, it will not be noticeable in the finished cloth; but if in any degree it should be lighter, correction will be necessary. By testing all the colors in this way, full and satisfactory shades may be assured.

Another serious difficulty is the staining tendency, whereby the white and light shades and mixtures become stained by the floating color from the darker shades. This floating and staining is confined to cotton contained in the mixtures, and seldom affects the wool stock. By including a sample of white cotton in the fulling and scouring test, as above described, the liability of the cotton to become stained may be determined, and corrections can be made in the dyeing if necessary. When the percentage of cotton employed is not large, good results may be obtained by using black cotton with the darker shades of brown, blue, green and other colors, by having the wool a trifle on the

light side as to shade, as in the finishing the wool will cover the surface, so that the mixture will not be noticeable. A sample book containing the result of tests made will be found valuable for reference as required.

Aside from the precautions mentioned, there is still a necessity for quite a different procedure in the finishing than is usual in the handling of all wool goods, which is worthy of consideration.

CURRENT TOPICS

Paying With Checks.

Recurring pay roll robberies have caused many employing concerns, that had thought it impracticable, to adopt the practice of paying off help with checks. This is rated as a benefit derived from an obnoxious evil.

Paying off in cash is a custom which comes down from what might be rated as antiquity. The practice still is necessary in some places. But there are not many which have not banking facilities for handling checks conveniently. In others some substitute arrangement for cashing checks might be arranged by the concern.

Paying off by check is good for all concerned. It causes employees to become familiar with this substantial form of currency and should stimulate their feelings of self-importance if not pride. It no doubt encourages them to establish bank accounts, exercise thrift and save money. Employees should prefer it to the cash method.

A Look Toward the East.

Those concerned about the "long-pull" future of the cotton textiles industry should not ignore the probable significances in the surprisingly large volume of American cotton which went to the Orient during the last season. The total exceeded 2,000,000 bales, these large exports into a virtually new quarter having had much to do with "saving" the cotton situation as it affected producers of the staple. The exports gave telling illustration of the great growth in recent years of cotton manufacturing in Oriental countries. This has much bearing on the industry as a whole in the Occident, where it has attained its present proportions because in large part of its immense sales of cotton goods in the Orient. The direct bearing on the industry in this country is not so pertinent as it is on the industry in Europe and notably Great Britain. We export only about 10 per cent of our cotton goods production, while the British look to markets abroad for around 80 per cent of their entire output of cotton goods. But the indirect bearing on the industry in this country may be quite important.

India and China have supplied the two greatest markets for the export cotton goods of the Western world. In both countries cotton has been grown and manufactured for ages past. Production of the staple can be much increased in both lands. But our consequential exports of cotton to both China and India last season, together with the much larger volume that went to Japan which hitherto has consumed Oriental cotton in the main, give assurance that, after all, the South can meet the competition of the tradition-bound Orient in the realm of primary production. But in that of manufacture the conditions are not so favorable to this country and Great Britain. Mills are now being set up and managed in the Orient by Occidentals and notably by the one Oriental people who can meet the Occidentals in the use of modern trade and industrial methods, the Japanese . The Oriental mills are in the midst of enormous markets, unlimited supplies of the cheapest of labor are available to them.

Cotton mills have been operated in India for nearly a hundred years. But the tropical climate, low living standards and the sway of tradition long kept them from offering any great threat to the supremacy of Western made goods even in that land. Yet India is now producing nearly half of the cotton goods consumed there. The cotton manufacturing industry of Japan dates back to the latter part of the last century. It now disputes with the industry in Great Britain and in Germany for second place, that in the United States being far in the lead. Japanese mills absorbed two to two and a half million bales of cotton last year. As British exports of cotton goods into India and China have declined those of the Japanese into those tremendously populous lands have increased. Our exports to India and China likewise have declined but they were large only occasionally. The Japanese no doubt soon will be offering the Occident large quantities of cotton goods of the better grades, for the country's increasing imports of American cotton imply rapid improvement in the kinds of products turned out. For the period of the last fifteen years cotton manufacturing has grown faster in Japan than elsewhere in the world. The net growth was less than that in the United States.

Since the World War the rate of growth in China has run ahead of that in all countries. With only 31 mills in 1915 there are now in China about 140 cotton manufacturing establishments equipped with modern machinery and directed by highly skilled technicians. Nearly one third of them are owned by Japanese.

Wages in all Oriental mills are imcomparably lower than in this country, Great Britain and most of Europe. In India the highest skilled mill operatives earn only $10 to $12 a month. In Japan the highest are around $20 a month. In China the bulk of operatives receive only a few cents for work days of 12 to 14 hours.

Actual labor costs, however, are much higher than the low wage scales imply. The lowest worker efficiency is in India, where in pre-war times the labor cost of producing textiles exceeded that in Great Britain and the United States. Labor costs are lowest in China, where a study made several years ago showed that an expenditure of only a little more than $5 for wages was required in producing 400 pounds of yarn.

Available data on both wages and labor costs in the mills of the Orient are not complete. These phases are ones which those who concern themselves with the international aspects of the industry should investigate.

For 12 to 15 per cent of the worlds' cotton spindles are now in the Orient. Output from them displaces goods that used to be made in the Occident. As the Oriental outlet narrows, the struggle for business in the Occident will become more intense. It may be fortunate that the industry in the United States is built around domestic needs. But if the industry continues to expand here, greater foreign outlets will become more and more desirable if not necessary.

In all these speculations, however, it should not be forgotten that per capita consumption of cotton goods, which since modern manufacturing began has increased tremendously, still is subject to much further expansion. For the world as a whole it still is but a small percentage of what ordinary comfort would require.

Freight Rates and Labor Troubles.

The South, where fine harmony as a rule between capital and labor accounts in much part for great industrial progress, should not be indifferent to new precedents being set or approached in the realm of official freight rate making in Washington. Several months ago, as noted in these columns, the Interstate Commerce Commission granted to bituminous coal operators in Pennsylvania, Ohio and Northern West Virginia a reduction in rates to Lake Erie ports. While the reduction was argued for on general grounds, it was sought and no doubt was granted largely because of the claim that operators of mines further South were underselling the northerners in the markets of the Northwest. Railroads serving the southern mines countered with a similar reduction, made without resort to the Interstate Commerce Commission. The commission then ordered that the reduction be suspended until a hearing could take place, for it would nullify the "help" which the commission had undertaken to give the northern mines. The commission also has made similar reductions for coal moving out of Illinois and Indiana through the lakes to the Northwest.

The difficulties of the northern operators are due in great part to labor troubles; a large proportion of them have been involved lately in a long, futile and useless strike on the part of employees. The mines are over-manned, making it impossible for them to provide full-time employment, and bringing about unnecessarily high labor costs. The southern mines are not over-developed, operators get along well with their workers, strikes rarely occur, and the business is managed energetically and efficiently. Shall southern mines be penalized for this? Should the Federal Government in exercising its rate making power try to sustain against logical forces an unbalanced and uneconomic adjustment between the southern and northern mines?

Under the so-called Hoke Smith Resolution, passed several years ago by Congress, the commission may do both, and it quite evidently is attempting to do both. For the Resolution directs the commission to take account of "conditions," which means anything, when making rate adjustments.

If rates can be so juggled on behalf of a group of troublesome coal miners, the Government's power of regulating railway transportation may be used for any purpose whatever. It was on account of such juggling of rates by railroad managers that the Government undertook to regulate the carriers. Now the Government flirts with the same evil and dangerous practice. For many reasons, not the least of them purely political ones, the South has most to fear from this radical departure from the traditional "just and reasonable" basis of rate making.

Suicide Stunts.

Public opinion quickly turned and properly against the epidemic of attempts, following the great exploit of Lindbergh, to cross the oceans by aeroplane. The epidemic, largely a matter of hysteria, has passed. The rating of persons who thus deliberately committed suicide—as did most of those who tried to outdo Lindbergh's achievement—with the bold explorers of old is false analogy. The Maggellans, Balboas and Cortezes thought little of acclaim; but for modern newspaper headlines not many of the recent suicide stunts would have occurred. They proved nothing except what was known by informed persons already, which is that airships are not yet capable of making reasonably safe trips over long ocean expanses. There is much of which they are capable—and a great deal of that is "unexplored." Why not first exploit the known possibilities? There is plenty of room for amateurs and daredevils to advance the business of flying elsewhere than across the oceans. Flying above land is still attended by enough danger, excitement and problems to give those who seriously desire to aid aeronautic development plenty to do. And it is there that the new science and art is being advanced most—and in the main by folk, both amateurs and professionals, whose names rarely appear in, and who care very little for, headlines. Lindbergh is of their kind. His feat, done with supreme modesty, was preceded by long and unnoticed "plodding" in the air.

Too Many Retailers.

The first complete census of retail distribution in a large community, as recently made under authoritative auspices in Baltimore, show what many economists have contended, namely, that there are too many retail stores. In recent years the "spread" between wholesale and retail prices has been about 10 per cent wider than formerly. Some of this owes to increased transportation costs, which have been trimmed somewhat by great shortening of the transportation cycle. But most of it is because nearly every one who has nothing else to do and can command a bit of capital or credit sets up a retail establishment of some kind. And the public seems willing to buy and sustain every bit of "service," no matter how unnecessary or foolish it be, which retailers offer.

It was found in Baltimore that there is a retail store for every 73 of the population. The average grocery store there serves only 283 persons. One person out of practically every 25 of the population is engaged in the work of retail distribution. When the average inventory of stock in some stores is, as found in Baltimore, as low as $176, it is easy for almost anyone to "enter" the retail business. Even the stock of goods carried by the average grocery store was found to be worth only $1,602.

It was found that about 12 cents of every dollar spent in making retail purchases go for wages paid by retailers. In some lines the wage cost was found to be as much as 25 per cent. Other costs have not been reported but they no

MATHIESON Industrial Chemicals

How Much Will a Dollar Buy?

THE frequent variations in the purchasing power of the dollar, as shown by the commodity price index, may give the popular impression that the buyer's money will often purchase more this month than it did last.

But the discriminating purchaser recognizes that even current price ranges are no certain measure of a product's value—that value is dependent upon factors other than price.

Purchasers of Mathieson Industrial Chemicals have learned by long experience that every Mathieson quotation is backed by the Mathieson reputation for dependability, by those Mathieson facilities that make prompt, efficient shipments possible, and by the assurance that the product meets the exact specifications of the buyer.

For these reasons, far-seeing purchasers always appraise the worth of EAGLE-THISTLE Chemicals on a basis that is far more important than price. They recognize the value of the Mathieson highly developed consumer-service—a service wherein every facility and resource of the perfectly coordinated Mathieson organization are placed at the consumer's disposal.

CAUSTIC SODA
LIQUID CHLORINE
BICARBONATE OF SODA
MODIFIED VIRGINIA SODA
SODA ASH
BLEACHING POWDER
ANHYDROUS AMMONIA
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EAGLE-THISTLE PRODUCT

The MATHIESON ALKALI WORKS Inc.
250 PARK AVE. NEW YORK CITY
PHILADELPHIA CHICAGO PROVIDENCE CHARLOTTE CINCINNATI
Works: Niagara Falls, N.Y.—Saltville, Va.

Deal Direct with the Manufacturer

doubt cause the total to be one-fourth or more of what purchasers pay in the average case.

Industry Follows the Sun.

Geological Survey folk have established a center of industry on the basis of the distribution of power that is generated by steam engines, steam turbines, water wheels and such in manufacturing and public utility plants. They hold that this is a truer basis of measurement than the capacity of prime movers in manufacturing plants only, as used by the Census Bureau. They find that the center is now about 50 miles southeast of Chicago. It has moved about 25 miles in a southwesterly direction since 1918 and about 75 miles in the same direction since 1908. The main tendency is westward with a strong pull southward, the inclination being somewhat towards the geographic center of the country which is on the northern boundary of Kansas. It is now nearer the center of population which is in southwestern Indiana.

Thus the Northeast's share of the country's industry continues to decline, while those of the mid-West, the Far West and notably the South, increase.

What the Southern Mills are Doing.

Contract has been let by the Proximity Mfg. Company, of Greensboro, N. C., to the Combustion Engineering Corp., for two boilers and two turbines for the White Oak Mills. J. E. Sirrine & Company, of Greenville, S. C., engineers on the project, announce that the power plants of the company's mills will be extensively re-vamped. This work includes two boilers complete with water walls and air preheaters and unit pulverized fuel equipment, from the Combustion Engineering Corp.; a 3,500-kw. General Electric double automatic extraction turbine, for the White Oak Mills; a 1,500-kw. General Electric single automatic extraction turbine for the Proximity Print Works; surface condensers for these turbines; and Westinghouse switchboards and transformers.

Goldsboro Narrow Fabric Company, Goldsboro, N. C., has been formally incorporated with a capital of $100,000 by Ernest A. Zecha, J. A. Parker and John R. Crawford.

The Rockfish Mills, Inc., has taken over the Clayton and Liberty Cotton Mills, Clayton, N. C., which will be operated by the new owners. R. L. Huffines is the head of the company, with headquarters in Rocky Mount, N. C.

Eno Cotton Mills, Hillsboro, N. C., have completed the installation of 150 looms, which brings the total up to 1,000. The plant produces ginghams and cheviots.

The new bleachery to be built by the Cannon Mfg. Company, Kannapolis, N. C., will be 321 x 278 feet, two portions to be two-story, 52x278 feet and 125 x 278 feet. Concrete foundations, brick walls, glass side walls, steel beams, cast iron columns, Barrett 20-year specification roof, concrete and maple floor will be used. F. P. Sheldon & Sons, Providence, R. I., are the architects and engineers.

Rhyne-Anderson Mills Co., Troy, N. C., have been purchased by E. O. Anderson and J. L. Staten, of Charlotte, and re-organized as the Troy Cotton Mills. Milton Ensor, who has been secretary, treasurer and general manager, will retain this position with the re-organized firm.

Industrial Dyeing Corporation, of New York, has completed plans for a plant at Charlotte, N. C. The officers are L. L. Wisner, president, Karl Ginter, vice-president, and W. H. Deerefield, secretary and treasurer and manager . The company will dye rayon yarns.

Morgan Cotton Mills, Inc., Laurel Hill, N. C., has acquired control of the Western Reserve Cotton Mills interests at Quitman and Millen, Ga.

C. V. Sellers purchased the White-Williamson Cotton Mills, at Graham, N. C., at receiver's sale. It is reported that the plant will be re-opened.

A two-unit cotton warehouse, 100x100 feet, is being erected by the Appleton Mfg. Co., Anderson, S. C.

Winnsboro Mills, Winnsboro, S. C., are erecting a school building in the village.

Pendleton Mfg. Co., Autun, S. C., will erect an extension to the weave shed to provide for additional looms. J. E. Sirrine & Company, Greenville, S. C., are the engineers.

Glenn-Lowry Mills, Aragon-Baldwin Mills, Whitmire, S. C., will erect 25 new houses for operatives. J. E. Sirrine & Company are the engineers.

Additions to cost approximately $50,000 will be erected by the Blair Mills, Belton, S. C.

Definite plans for a dyeing, bleaching and finishing plant at Traveler's Rest, S. C., a few miles north of Greenville, have been made by Woodward, Baldwin & Company. It is understood the plant will finish the products of Brandon, Poinsett, F. W. Poe, and Woodruff mills, which are sold by the Woodward, Baldwin organization. J. E. Sirrine & Company are the engineers.

The addition to be erected at Inman Mills, Inman, S. C., will be four-story, 78 x 155 feet, and will be used for increase in manufacturing equipment. J. E. Sirrine & Company are the engineers.

Bemis Cotton Mills, Bemis, Tenn., are installing new H & B pickers, and are also building a five-department warehouse, 128x400 feet. Also, 75 new houses are being erected in the village to provide for operatives for night operation.

Massachusetts Cotton Mills Division, Pepperell Mfg. Co., Lindale, Ga., have let contract to Batson-Cook Company for an addition to the dyehouse, to be two-story, 54x150 feet, part reinforced concrete, part mill construction. F. P. Sheldon & Sons, Providence, R. I., are the engineers.

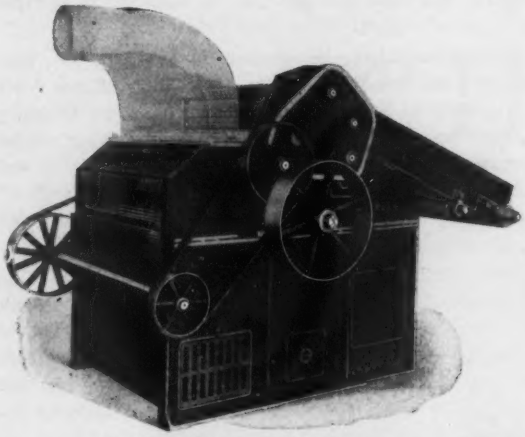
Contract for the addition to the Swift Spinning Mills, Columbus, Ga., has been awarded to T. C. Thompson & Brother, Charlotte, N. C. The addition will be three-story, 150x133 feet, and will house additional yarn manufacturing equipment.

Gloria Textile Co., Johnson City, Tenn., are erecting an addition to the plant.

The new Magnolia Cotton Mills, Magnolia, Ark., will have 112 Draper looms, to manufacture broadcloths. The spinning machinery has been purchased from Saco-Lowell Shops.

Lockwood, Greene, & Co., through the Charlotte office, recently announced the letting of the following contracts for various mill improvement work on Mills Mill No. 2, Woodruff, S. C.: for heating and boiler house piping, to Grinnell Company; shafting, hangers, pulleys, etc., T. B. Woods Sons Company; transformers, Westinghouse Electric & Mfg. Co.; starters, motors, etc., Allis-Chalmers Co.; Page fence, General Equipment Company. On Whitney Mfg. Co., Whitney, S. C., complete sprinkler system, Grinnell Co. On Oakland Cotton Mills, Newberry, S. C., water main, to Summer Bros. On Pacolet Mfg. Co., Pacolet, S.

It Is Worth Looking Into!



Lattice Opener and Cleaner

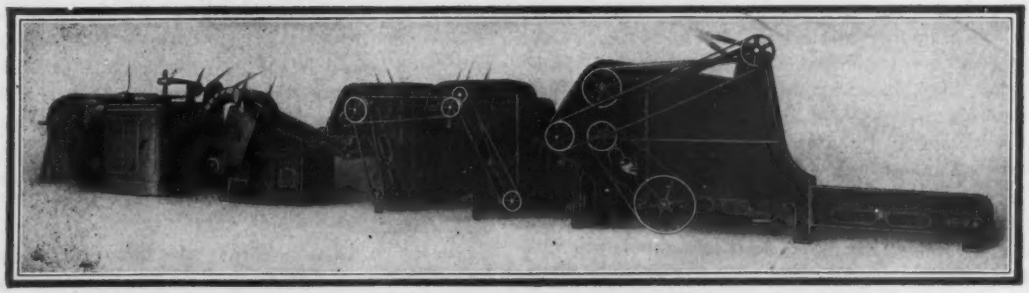
Here are Some of the Comments on our LATTICE OPENER and CLEANER that the Mills are Constantly Writing Us—

"We find that after installing this machine we are able to use a lower grade of cotton and yet obtain as good results as before."

"The Lattice Opener and Cleaner gives the stock such a preparation that the Vertical Openers do their work far more effectively."

"We consider this machine for fluffing and cleaning our cotton far superior to any machine in our chain of Cleaning machinery."

"There is a noticeable improvement in the appearance of our carding since installing your No. 12 Lattice Opener and Cleaner."



SACO-LOWELL

Largest Manufacturers of — *It pays to Install Modern Machinery* — *Textile Machinery in America*

147 MILK ST., BOSTON, MASS.
Southern Office and Shop—Charlotte, N. C.
Branch Offices—Greenville, S. C.—Atlanta, Ga.

C., heating system, Grinnell Co. On Arcadia Mills, power wiring installation, Huntington & Guerry; and switchboard, General Electric Co.

New England Mill Situation.

The affairs of the Amoskeag Company and its subsidiary, the Amoskeag Manufacturing Company of Manchester, N. H., have again been in the limelight. It became known on September 8th, through a communication to the stockholders from the trustees of the property, that an option sought by Curtis & Sanger, Boston bankers, had been declined. The communication to the stockholders stated that the option for 60 days was wanted to purchase the property on the following terms: $100 a share and accrued dividends for the preferred shares; $90 per share for the common shares plus whatever may be realized from a liquidation of the quick assets of the Amoskeag Manufacturing Company, 91 per cent of whose stock is owned by the Amoskeag Company; but less the expenses of liquidation, liabilities, and an allowance of $1 per common share for the bankers, or $345,000. The bankers stipulated, in requesting the option, that they be given opportunity within 60 days to satisfy themselves by investigation of any kind into the properties, and if the investigation proved satisfactory to carry out the terms of the purchase.

In declining the option the trustees stated that they objected to the investigation, for if it proved unsatisfactory, the bankers would be in possession of informatoin very useful to competitors and capable of being used to the detriment of stockholders' interests. They stated that the purchasers proposed to liquidate the quick assets. Their interest will be to get their money as quickly as possible rather than to obtain the best price, because everything realized from quick assets after expenses, etc., will be given to stockholders. There will be a strong incentive to liquidate quickly even at a sacrifice and stockholders would be the losers by forced sales of goods and supplies. The proposal also includes nothing for the plant, land, buildings, water power, etc., carried on the books at $16,000,000, and assessed for more than that sum. In other words, the proposal gives the purchasers the plant for nothing. For these reasons the inadequate offer was declined.

That the offer was declined was not surprising, as the bankers themselves admit that the quick assets would probably realize more than $105 for the common shares, and because no hint was given of an offer for the plant itself. The annual meeting of the Amoskeag Co., will be held in Manchester October 5, at which the stockholders will be asked to "authorize the trustees, if deemed wise, to liquidate in their discretion the whole or any part of the assets upon such terms and conditions as they deem for the best interests of the stockholders."

The statement is made that even if the stockholders act favorably on the proposition there is no likelihood that the trustees will take immediate steps to liquidate. Some of the trustees are known to favor liquidation and there seems to be no question but what liquidation would net par for the preferred and better than par for the common stock. It is probable that, as in the case of some of the of other New England mill properties, there is a lack of desire to invest in machinery to produce goods other than those for which the plants are now equipped.

At the meeting of the York Mfg. Co., stockholders at Saco, Me., it was decided to continue operations. Fred W. Steele, formerly of New Bedford, and later of the Tremont & Suffolk mills, Lowell, Mass., has become manager of the properties and he is confident that the mills can be changed over to show a profit in the near future.

Stockholders of the Newmarket (N. H.) Mfg. Co., have authorized the directors to issue 5400 shares of new stock at par, $100, to be offered one to five, the new financing to cover the expense of providing more working capital and paying for the new machinery installed in the Lowell branch. The treasurer and selling agent of the mill offered to take 1,000 shares of the new stock. The mill makes silk goods, although originally it was a cotton mill.

At a meeting of the stockholders of the Lyman Mills, of Holyoke, Mass., it was voted to liquidate the company. There were 10,125 votes for the proposition and 4,040 against it. This liquidation is expected to net at least $165 a share to the stockholders. It was voted after protests were made by stockholders who are citizens of Holyoke and who feel that the throwing of 1200 people out of work will be a serious injury to the city.

At Fall River, the proposition to liquidate the Osborn mills was not pressed and engineers are at work appraising the property and forming some idea of what is required to rehabilitate its machinery. The Troy mill of that city has resumed operations after a short shut down and so has the Durfee mills. A report is in circulation that capitalists of Jacksonville, Fla., have organized a Troy Cotton and Woolen Mfy. there to build mills that are to be equipped with machinery taken from the mills of five corporations in that city. Nothing seems to be known of the matter in Fall River, although it is admitted that there is plenty of machinery for sale there, and much of it is as good as machinery installed in most mills making similar goods. save in the matter of automatic looms.

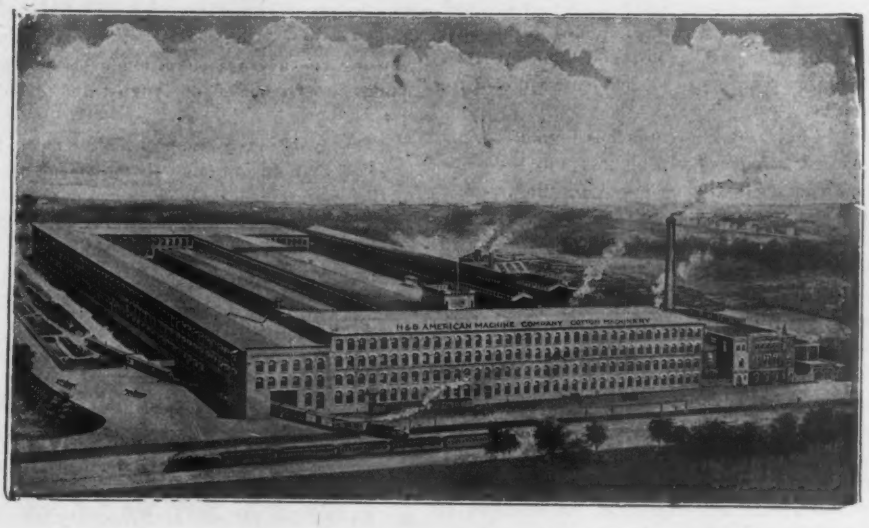
It is now pretty generally accepted by some of the Boston interests familiar with Boston financing of cotton mills that there are several banking trustees of various estates that are quite willing to see plants liquidated as their clients have no intention of reinvesting to improve the plants to be operated in New England.

Despite this gloomy side of the New England picture it is stated that the fine and fancy goods mills of New Bedford made money in the past quarter and have orders in hand that will keep them fully employed to the end of the year, if no new business develops in the meantime. As a matter of fact, manufacturers in that city state that if they can secure reasonable taxation, and less restrictions imposed by legislation, they have no fear of competition in their lines.

In Rhode Island some of the larger plants are now running in full, and their managers are sanguine of a steady volume of business right up to January at least.

Rayon continues to be a very large factor in New England mill production. More fancies are being made than ever before, in which finer sizes of rayon yarns are being used. The large printers who have developed special foundation fabrics of fine rayons for printing purposes have had a gratifying success in their offerings of printed rayon fancies for Spring and are not going to be able to secure all the gray cloth they can sell for the early part of the season at least.

COTTON MACHINERY



WE BUILD

EXHAUST OPENERS—HOPPER BALE OPENERS—CRIGHTON OPENERS
BUCKLEY OPENERS—SELF FEEDING OPENERS

FEEDERS—COTTON CONVEYING SYSTEMS—ROVING WASTE OPENERS
INTERMEDIATE and FINISHER LAPPERS

REVOLVING FLAT CARDS—DRAWING FRAMES (Mechanical or Electrical Stop Motion)
SLUBBING—INTERMEDIATE and ROVING FRAMES
SPINNING FRAMES and TWISTERS

(Band or Tape Driven)

SPINDLES—FLYERS—FLUTED ROLLS

Descriptive Bulletins Sent on Request.

H. & B. AMERICAN MACHINE CO.

Pawtucket, R. I.

Southern Office, 814-816 Atlanta Trust Co. Bldg., Atlanta, Ga.

The Pepperell and Naumkeag wide sheeting mills are operating to capacity limits and some departments are being run at night to meet the demand for some of the sizes of sheets and pillow cases wanted. The Pacific mills also report a good business on their lines of wide sheetings, sheets, and pillow cases. The Lonsdale Company of Rhode Island has done a good volume of business on standard fine yarn bleached goods and also the famous Hope muslins.

The gingham mills continue to do a slow business on strictly gingham fabrics and have done moderately well on some of the specialties in rayon they are now making. The mills that have gone on to rayon damasks, and rayon curtain materials, in conjunction with fine combed yarns, have been doing better in the past month and some of them have booked satisfactory orders to keep them employed for two or three months.

The situation in extra staple cotton has become serious for the mills making fine combed numbers and there has been a distinct hardening in prices asked for fine combed yarn cloths and fine combed yarns since the last cotton report was issued. The comment made by the Bureau of Economics concerning the probability of lower cotton later on carried no comfort to users of extra staple cotton for the reason that wherever they are able to secure any offers the prices are the highest that have prevailed for a very long time. No relief seems likely from Egyptian cotton, nor have the late reports from Pima cotton been very heartening. Spot stocks have been picked up wherever available.

The sharp criticism directed at the Department of Agriculture and which has led President Coolidge to remark that the government must not engage in the business of predicting prices has found a responsive chord among many New England mill men. They have not been at all pleased for a long time by the drift toward government interference with business on the score of standardization, distribution of statistics, etc., as they have long noted that a great deal of mischief results from comments issued by the government upon statistics it happens to be dealing with.

Necessarily, the government cannot be up-to-date with its figures. But it seems ridiculous to read in government publications that are reproduced in the daily and other press, comments on the cotton industry that relate to conditions six or eight weeks old and have no sort of bearing upon trade as it has existed on the day of publication.

It may well be imagined of what little value trade comments of a month ago bearing upon market conditions can have upon the conditions that exist today. Nevertheless, in nine cases out of ten, because the belated report is issued with a government hall-mark on it, there are plenty of buyers of goods and a vast majority of the public engaged in the business that will give serious credence to the government report. This has happened more than once when all the figures in the hands of merchants showed a vastly changed condition in the interval.

New England manufacturers who have been seen since the report of the Bureau of Economics was issued have questioned whether the Department was so much to blame as legislators who constantly accede to requests for just that kind of service from government departments because it may happen to please some constituent.

It has been demonstrated very recently that some of the private reports on cotton and some of the reports on cloth conditions emanating from associations in the trade have been far more timely and far more useful than anything the government has been turning out, under the law.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, September 10th, 1927.

Unfavorable wet weather having continued during August, except in Texas where something of a drouth was experienced, boll weevils multiplied and spread to nearly all sections of the cotton belt, doing considerable damage, serious in many states, especially in Oklahoma, South Carolina, Georgia, Alabama, Mississippi, Louisiana and Texas, causing the average condition of the crop to decline 13.4 points, or from 69.5 on August 1st to 56.1 on September 1st.

The prospective crop situation was intensified by a greater than the normal abandonment of acreage, returns to the government indicating an average abandonment of 4.8 per cent since July 1st, representing an abandonment of 2,057,000 acres, leaving for harvest only 40,626,000 of the 42,683,000 planted, against 47,087,000 acres harvested last season.

Accordingly, with such data in hand, the government saw fit to revise downward by 800,000 bales this years' indicated yield, returns as of September 1st pointing to a yield of only 12,692,000 bales compared with 13,492,000 indicated as of August 1st, which compares with last year's record production of 17,977,000 bales, showing a decrease compared with one year ago of 5,285,000 bales.

Except for periods of temporary depressions, the market tended higher on the strength of numerous unfavorable private crop reports, pending receipt of the September Bureau report, and when government figures were released, the market bulged to the highest levels reached so far this season—24.45 for December delivery, showing a further advance for the month of $24.00 per bale. As a matter of fact the price of cotton doubled in value since last winter.

SEASON'S INDICATED SUPPLY OF AMERICAN COTTON.

BALES	This Season	Last Season
World's carry-over, August 1st.	7,238,000	5,639,000
Indicated crop, including linters, etc.	13,800,000	19,100,000
Prospective season's supply	21,038,000	24,739,000
Worlds' consumption	(?)	17,428,000

While the statistical outlook is bullish as to probable developments eventually from the world's season's supply and demand point of view, it is decidedly more bullish as regards the situation in the United States which has to provide for the wants of American mills and export requirements.

At the close of last season available stocks in the United States, exclusive of mill stocks, were smaller than last year—2,333,000 bales against 2,570,000, the record crop of last year notwithstanding.

The indicated season's available supply in the United States is so limited that it points to 3,331,000 bales less than what was exported and taken by American mills last season, or only 16,133,000 bales against 19,464,000. Last season American mills took 8,220,000 bales, and exports from the United States were 11,244,000. When it is realized that this year's crop, including linters, points to only

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—*working against time.*

Delays in materials—other unavoidable delays. Time lost *must* be made up.

Your Jacquard machines *must* stand the test of continuous running—they *must* not fail.

HALTON JACQUARDS are built to stand PRESSURE. Every machine is tested—its performance sure.

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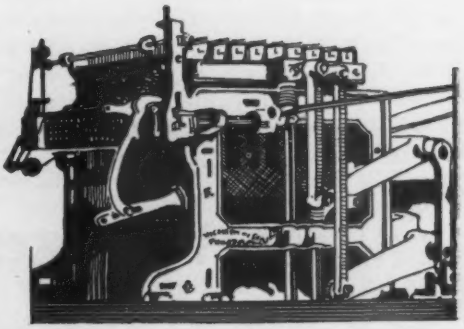
We do harness building of every description.

We are prepared to furnish at short notice comber-boards, lingoes, mails, etc. Ingrain and Brussel parts.

We do replacing and repairing of Jacquard machines of other makes as well as our own.

Immediate and expert attention our guarantee.



"USE A HALTON JACQUARD AND YOU USE THE BEST"

Martha Mills, Thomaston, Ga.

This is the new tire cord plant of the Hightower interests. The mill is 432 feet long x 134 feet wide, three stories high. The opening and picking departments are located in a separate building, the picker room being connected to the carding department on the second floor of the main mill by means of an enclosed overhead passage way. Robert & Company, Inc., of Atlanta, were the engineers.

about 13,800,000 bales and that the world consumed 17,428,000 bales of American cotton last season, it cannot be denied that the prospective statistical situation promises to be very bullish.

To put the present position in a more concrete form. Suppose we allow 7,220,000 bales for American mills vs. 8,220,000 last season, and allow 8,913,000 bales for exports against 11,244,000 last season, which is 1,000,000 less than last year for domestic mills and 2,331,000 less than last season for exports, there would not be one bale left, outside of mills, on this side of the Atlantic by the close of next July, as 7,220,000 bales for American mill takings and 8,913,000 for exports, make 16,133,000 or the same as the indicated supply for this country.

Since September 1st, the date on which the last government crop forecast was compiled, weather conditions inland have been generally more favorable, and it is possible, although the weevil have to be reckoned with, that the crop may improve somewhat, especially if the weather continues good during the remainder of September. Meanwhile we suggest that American mills provide for their future wants while the cotton is available.

First Edition of Combined Directories.

The first consolidated volume of Davison's Textile Blue Book and Dockham's American Report and Directory has been issued, the features of both volumes are continued in this edition, giving the features of both in one issue. The directory shows every mill report carefully revised, with new features, including statistics showing the number of spindles, looms, cards, etc., in the country. A separate list of new mills is shown. The directory can be obtained through COTTON, or from the publishers, Davison Publishing Co., 50 Union Square, New York. The prices are, office edition, $7.50; handy edition, $5.00; salesman's directory, $4.00.

Mathieson Alkali Changes.

H. D. Honan has been made St. Louis district sales manager for the Mathieson Alkali Works, Inc., replacing F. H. Lovenburg, who has been assigned to the New England district sales office, Providence, R. I. The head office of the company is at 250 Park Ave., New York City.

Textile Trends.

(*Continued from page* 1198)

Dwight Mfg. Co., Alabama City, Ala.; Drayton Mills, Spartanburg, S. C.; C. R. Miller Mfg. Co., McKinney, Texas.

Russell Mfg. Co., Alexander City, Ala.; Monticello Cotton Mills, Monticello, Ark.; Eastman Cotton Mills, Eastman, Ga.; Unity Spinning Mills, LaGrange, Ga.; McIntosh Mills, Newnan, Ga.; Strickland Cotton Mills, Valdosta, Ga.; Chronicle Mills, Belmont, N. C.; Sapona Cotton Mills, Central Falls, N. C.; Cliffside Mills, Cliffside, N. C.; Gibson Mfg. Co., Concord, N. C.; Florence Mfg. Co., Forest City, N. C.; Vann-Moore Mills, Franklin, N. C.; Priscilla Spinning Mills, Gastonia, N. C.; Allred Mills, Granite Falls, N. C.; Proximity Mfg. Co., Greensboro, N. C.; J. M. Odell Mfg. Co., Pittsboro, N. C.; Hannah Picket Mills, Rockingham, N. C.; Somerset Mills, Roxboro, N. C.; Hadley-Peeples Mfg. Co., Siler City, N. C.; Green River Mfg. Co., Tuxedo, N. C.; Sand Springs Cotton Mills, Sand Springs, Okla.; Appleton Mfg. Co., Anderson, S. C.; Riverside Mills, Anderson, S. C.; Laurens Cotton Mills, Laurens, S. C.; Mollohon Mill, Kendall Mills, Newberry, S. C.; Martel Mills, Spartanburg, S. C.; Gloria Textile Co., Kingsport, Tenn.; C. R. Miller Mfg. Co., Dallas, Texas; Houston Cotton & Twine Mills, Houston, Texas; Houston Textile Mills, Houston, Texas; San Antonio Cotton Mills, Kingsville, Texas; Lanett Bleachery and Dye Works, Lanett, Ala.; Yates Bleachery Co., Flintstone, Ga.; Southern Specialty Co., Charlotte, N. C.; Elmore Co., Spindale, N. C.; Southern Mercerizing Co., Tryon, N. C.; Fort Mill Mfg. Co., Fort Mill, S. C.; Kerr Bleaching & Finishing Co., Concord, N. C.; Yadkin Cotton Mills, Roaring River, N. C.; Peperell Mfg. Co., Lindale, Ga.; Cannon Mfg. Co., Kannapolis, N. C.; Sadie Cotton Mills, Kings Mountain, N. C.

Repairing Worn Flyers.

Saco-Lowell Shops is distributing a pamphlet describing their service in the repairing of worn flyers. Descriptions of the methods used in repairing are given, and instances cited to show considerable saving over the cost of new parts by repairing worn equipment.

Top Rolls
Spindles
Comb Boxes

Special Parts Demand *Special Lubricants*

This applies to the Textile Industry more than to any other industry.

You cannot disregard this important fact. You cannot hope by trial and error to have "general" or "substitute" lubricants do the work as well as TEXACO special lubricants. Oils not suited are bound to retard the operating efficiency of the parts lubricated, increase the cost for power, and what is most undesirable, increase the percentage of "oil spots" and "seconds."

The Texas Company's Lubrication Specialists have spent years of study—in our own laboratories and in co-operation with machinery designers and builders—to determine lubricating requirements for every type of machine or machine part in the Textile Industry.

These experts have found (as you have found) that the special conditions applying in the Textile Industry demand special lubricants.

So, when you ask *us* for a lubricant for comb boxes, for example, The Texas Company does not expect you to "try" different kinds; but we give you the finest product possible for comb box lubrication — TEXACO STAR GREASE A.

For top rolls, we do the same—we give you a special lubricant for top rolls—TEXACO STAR GREASE B.

For spindles—TEXACO SPINDLE OIL, and so on. Always a *special lubricant* which the special condition demands.

This is sensible—it is right.

Try any of these special TEXACO Textile Lubricants once and you will learn why so many Textile Mills are thoroughly in accord with our policy of

Special TEXTILE LUBRICANTS
for
Special TEXTILE CONDITIONS

Adequate delivery facilities and ample stocks assure prompt delivery anywhere.

TEXACO TEXTILE LUBRICANTS

THE TEXAS COMPANY

Texaco Petroleum Products

Dept. CX, 17 Battery Place, New York City

OFFICES IN PRINCIPAL CITIES

NOTES ABOUT MEN YOU KNOW OR KNOW ABOUT

CARL MOORE, who has been secretary to L. Lanier, agent of the West Point Mfg. Company, West Point, Ga., is the agent of the new plant of the West Boylston Manufacturing Co. of Alabama, at Montgomery, Ala.

ROBERT HORSLEY recently resigned as superintendent of the Opelika Manufacturing Company, Opelika, Ala., and will be superintendent of the West Boylston Manufacturing Co. of Alabama, Montgomery.

K. B. COOK is now technical superintendent of the Winnsboro Mills, Winnsboro, S. C., which is operated by Lockwood, Greene & Co., for the U. S. Rubber Co., the owners. Mr. Cook was graduated from the Lowell Textile School in 1913, having taken the cotton manufacturing course. For three years he was designer and assistant superintendent of the American Mills Co., Waterbury, Conn., manufacturers of narrow fabrics, elastic and non-elastic. In 1916 he went with the U. S. Rubber Company development department, and in 1917 helped to organize the textile section of the company. For three years he was in charge of the research laboratory, and during the war worked in conjunction with the Government in the development of aircraft fabrics, gas masks, navy life preservers, etc. For the past eight years he has been manager of the textile section. Mr. Cook for three years has been secretary of Committee D-13 of the American Society for Testing Materials.

H. B. TAYLOR, for eleven years superintendent of the cotton department, Pacific Mills, Lawrence, Mass., has resigned, and H. A. Newton, general superintendent of the Cocheco Division of the company, Dover, N. H., will succeed him. Mr. Taylor had been connected with the Lawrence plant for seventeen years, having been overseer of the yarn mill before his promotion to the superintendency of the properties. He plans an extended vacation before assuming other duties, the details of which have not been announced.

ROBERT P. BROWN, formerly treasurer and superintendent of the C. B. S. Knitting Co., Leesport, Pa., has become superintendent of the Modern Textile Co., Harrisburg, Pa.

J. M. WILLIAMS has been named superintendent of the Tifton Cotton Mills, Tifton, Ga., succeeding the late W. R. Neighbors. Mr. Williams, who has recently been located in Kings Mountain, N. C., was formerly superintendent of the Barrow County Cotton Mills, at Winder, Ga.

M. BOZEMAN is superintendent, and R. D. Saunders, manager, of the Western Reserve Cotton Mills, at Quitman and Millen, Ga., which have been acquired by the Morgan interests of Laurel Hill, N. C.

R. E. HENRY, president of the Dunean Mills, Greenville, has accepted in addition the presidency of Watts Mills, Laurens, S. C., succeeding George M. Wright. R. G. Henry, agent of Dunean, will act as manager of the Watts mill, both retaining their headquarters at Greenville.

J. F. CHALMERS, overseer of weaving, Mill No. 1, Glenn-Lowry Division, Aragon-Baldwin Mills, Whitmire, S. C., has resigned to become overseer of weaving and cloth room at Fort Mill Mfg. Co., No. 1, Fort Mill, S. C. J. M. James, whom he succeeds at Fort Mill, succeeds Mr. Chalmers at Whitmire.

FLOYD W. JEFFERSON has resigned as vice-president of Hunter Manufacturing & Commission Company to become associated with William Iselin & Company.

H. G. WELBORN is secretary of the new Welborn Mills, Lexington, N. C.

DAVID L. HOWARD has been promoted to the position of general superintendent at the Brookford Mills, Brookford, N. C. He was formerly assistant superintendent.

C. H. ROBERTSON, superintendent of the Eno Cotton Mills, Hillsboro, N. C., has been made general manager of the company.

J. T. BYNUM has become overseer of spinning at the Appleton Mfg. Co., Anderson, S. C.

E. P. HOLLIS has resigned as overseer of weaving at Thomas Henry & Sons, Nashville, Tenn.

L. L. HURLEY, formerly superintendent of the Osceola Mills, Gastonia, N. C., has become superintendent of the Hickory Spinning Company, Hickory, N. C.

L. WILLETT has become superintendent of the Vance Cotton Mills, Salisbury, N. C.

J. M. WADDLETON is now overseer of weaving at the Jennings Cotton Mills, Lumberton, N. C.

J. E. CANNON has become overseer of weaving at the High Shoals plant of Manville-Jenckes Company, High Shoals, N. C. He was formerly located at the Inman Mills, Inman, S. C.

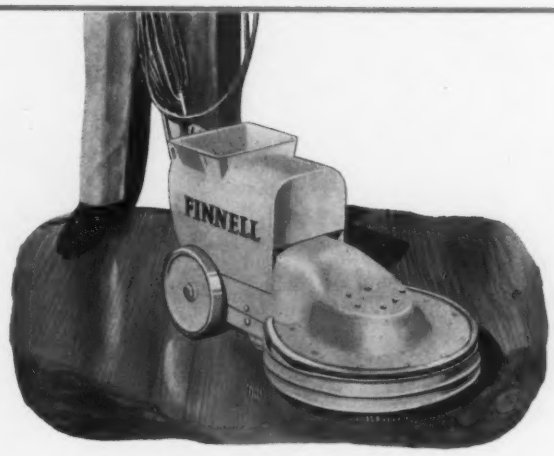
W. M. MCLAURINE, secretary-treasurer, American Cotton Manufacturers' Association, Charlotte, N. C., has removed headquarters from the Commercial National Bank Building to Suite 1206 in the First National Bank Building.

C. J. GAULT has become overseer of spinning at the Phenix Mills, Kings Mountain, N. C. He formerly held a similar position at the Dilling Cotton Mills, Kings Mountain.

W. S. NICHOLSON, son of Emslie Nicholson, has been elected president of the Union-Buffalo Mills Co., Union, S. C., succeeding the late H. B. Jennings.

E. PAYSON GIBBS, general superintendent of Pepperell Mfg. Co., Biddeford, Maine, has resigned. Mr. Gibbs has been associated with the company for 16 years. He worked under his father, G. K. Gibbs, and was made superintendent of the Pepperell division under Ernest L. Morrill, then agent of the mill. Upon his father's death, he was named superintendent succeeding him. He was made acting agent upon the resignation of Mr. Morrill, refusing permanent appointment to the office. When Howard R. Whitehead was made agent, Mr. Gibbs assumed the position of general superintendent of both divisions of the company. Mr. Gibbs' plans have not been announced.

Clean Floors Cost Nothing
it is *lack* of them that costs



WHAT would it be worth to you to reduce by two thirds the waste in your mill? CLEAN FLOORS are only a starter, but they are the basis for saving waste, which is largely a matter of human carelessness. The value of CLEAN FLOORS in textile mills has been proved by five hundred or more installations of the FINNELL SYSTEM.

The most matter of fact man in the textile industry can not avoid this fact: that CLEAN FLOORS promote clean habits and clean habits make for orderliness and neatness of work and living; they save thousands of dollars in the waste of raw or semi-finished materials and in the care and handling of equipment.

Mopping Not Clean Enough

A mopping crew is scarcely better than a sweeping gang because there is too much floor space for them to clean quickly and efficiently—too much grease, oil, dirt and lint for them to handle by the antiquated hand system of mopping. Before they are finished mopping a few hundred square feet it is tracked up by the bobbin boys and the like with their trucks. The dirt and grease from the uncleaned portion of the floor is tracked over the freshly mopped floor. Then, too, mopped floors are a long time drying, making them unsafe and slippery.

The vast majority of minor accidents in mills that cause the loss of time of well trained and efficient operators come from slippery floors. You can avoid these accidents—you can promote cleanliness and you can have beautiful surroundings in your mill by the adoption of the FINNELL SYSTEM of Electric Scrubbing.

The Modern, Electric Way

The FINNELL Electric Floor Machine scrubs floors *really* clean in half the old-method time. Its powerful brushes dislodge dirt from every nook and crevice, without injury to the most delicate floor surface. It gets all the filth out of the cracks of the boards and the grain of the wood. It takes mechanical scrubbing with a strong electric motor and lots of pressure and speed to do this. A mop can never do it.

There are eight FINNELL models to meet every possible floor type or condition. There are large machines to do large area scrubbing—smaller models able to get under machinery and into narrow aisles. We specialize in providing the *system* best adapted to your particular needs.

If you would like further description please write us. If you include details of your floor space, equipment, etc., we shall be glad to give you a sound estimate of the system best for you.

FINNELL SYSTEM, INC., 1610 East St., Elkhart, Ind. (Factories, Elkhart Ind., and Ottawa, Ont. District offices in principal cities of U. S. A.)

FINNELL

ELECTRIC FLOOR MACHINE

It waxes *It polishes* *It oils* *It scrubs*

In Every Section of the

Chicopee Mfg. Corp., of Georgia finds it advantageous to use Boyce Weavers Knotter

In line with the selection of the most modern and efficient equipment throughout the mill, the Chicopee Mfg. Corp. of Georgia is equipped with Boyce Weavers Knotters.

On the winders, warpers and looms of this plant many dollars will be saved each year by this scientific knot tying device. Because Boyce Knotters tie perfectly at rapid speed—the knots weaving right into the cloth and burying themselves.

Thus the Chicopee plant will increase production, produce better goods, and decrease their number of seconds. You can also benefit by this device.

your disposal. Give us your problems—or write for further general information.

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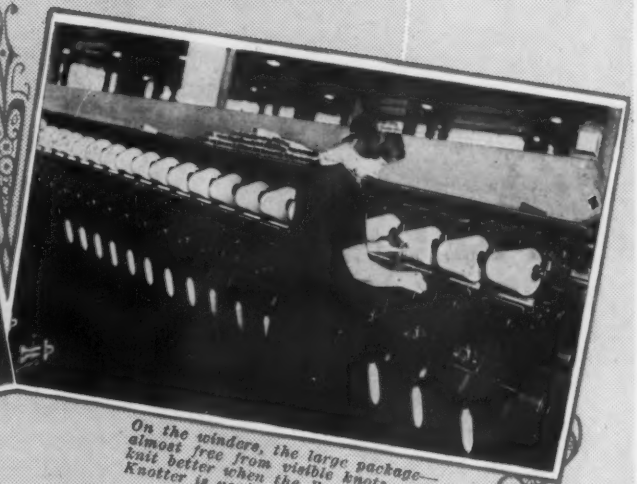
European Agents:
Mellor, Bromley & Co., Ltd.
Leicester, Eng.

BOYCE Weavers

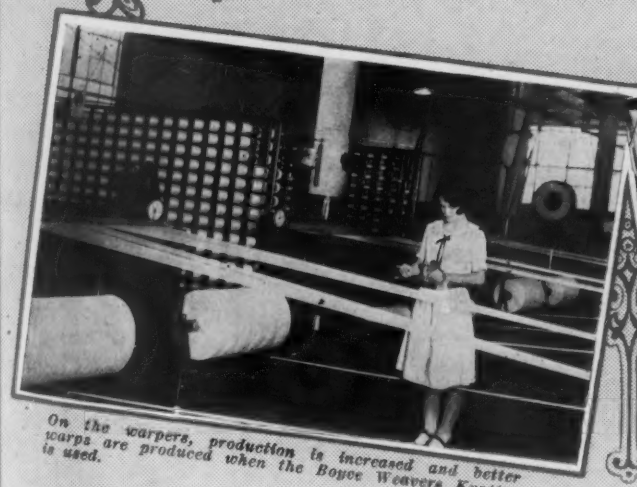
Mill where Knots are Tied

manufacturers will find it worth while to[investigate the Boyce Weavers Knotter

On the spoolers, the girls can not only give greater production, but a smoother yarn with smaller knots, that will eliminate the trouble in weaving.



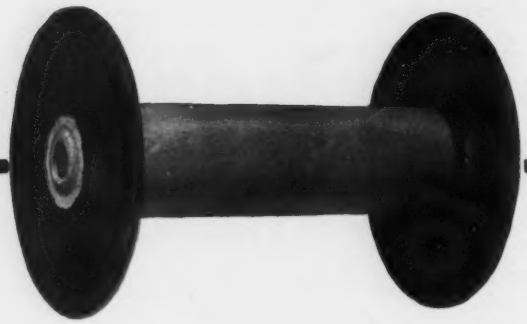
On the winders, the large package—almost free from visible knots—will knit better when the Boyce Weavers Knotter is used.



On the warpers, production is increased and better warps are produced when the Boyce Weavers Knotter is used.

On the looms you'll find that the use of the Boyce Weavers Knotter will not only speed production, but produce a marked improvement in weaving

KNOTTER



U S Fibre Head Spools Are a Good Investment

U S Vulcanized Fibre Head Spools are true running—durable—practically indestructible. Dogwood bushings, maple barrels, and the highest obtainable grade of vulcanized rag fibre are combined by U S experience to produce the best spool you can buy.

Eliminate your Spool Replacement Expense. Spool waste is practically eliminated. Smooth, sliverless heads insure freedom from knots and injuries to operatives' hands. Faster and easier spooling and more yardage mean greater production.

Consider the advantages of using spools with heads that will not warp in regular mill usage, come off or apart, crack or sliver. U S Vulcanized Fibre Head Warper Spools are so guaranteed in construction and are further guaranteed to give long service and satisfaction. These advantages coupled with the U S guarantee make U S Vulcanized Fibre Head Warper Spools a good investment even for the mill which buys strictly on price.

You want spools like these. Why not order yours to-day. Write, Phone, or Wire.

U S Bobbin & Shuttle Co.

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Branch Offices:

Greenville, S. C.

High Point, N. C. **Atlanta, Ga.** **Philadelphia, Pa.**

U S salesmen are specialists on bobbins, shuttles and spools. Order direct from U S for real helpful and understanding service.

AN OLD TIMER SAYS

In working with zest and giving his best,
Just for the pleasure of giving,
In the hope of helping his brothers along,
"Old-Timer" finds the sunshine of living

"Come on in, Jim! How's the folks?"

"Fine, Old Timer. How's everything getting along with you?"

"O. K., Jim, but if you have come over to continue our talk about 'Little Points of Law Every Mill Man Should Know,' I am not sure that I am ready to carry on."

"Why, Old Timer? I promise not to go to sleep again, and you have really got me interested, aside from saving me a nice little bunch of money on that piece of property I bought."

"Yes, I know, Jim. You may be somewhat interested because I happened to give you a few illustrations that fitted your particular case, but you know there are several thousand mill men that see our talks, Jim, and I have no way of knowing whether you are the only one interested or not—then there is that long-legged, cross-eyed, pigeon-toed,—"

"Never mind saying any more, Old Timer. I know who you are talking about. You always seem to lose your temper when you mention the editor, and I can't understand why. I've always thought he treated you pretty nice."

"He fired me once and—"

"Oh! That's your grouch is it. Well, here is where I think Jim can give you a little advice, Old Timer. In fact I have always thought you were too broad-minded to let a thing like that stick in your craw. That would go years ago, old man, but there is a new type of overseer and superintendent being developed these days—he is not the man to hold a grouch any more. When he and his employer have their difficulties they have it out right there and then and each of them starts out again with the full determination to avoid such unpleasantness and to be sure of that they let the past be the past. It is true that some of you old fellows may be slow to realize there is practically a new school of thought along these lines, but you had better wake up, Old Timer, and realize that your employer is generally your best friend and he is having to get in behind you for your own good. You know some of these hard-headed old fellows are like shadows anyway—'always on the other side.'

"Smartness enables a man to catch on, but *wisdom* tells him when to hold on to a good job."

"Say!—"

"Just a minute, Old Timer, here is one axiom that has done me more good than any one thought I ever tried to remember, and it would save many an overseer and superintendent their jobs if they would write it down in their note books so they would be sure to remember it—

"Never let your temper cost you friends or money."

"Pretty good, Jim. I give up. Now about this law business.

"'A partnership is a combination of two or more persons of their property, labor or skill for the purpose of making a common profit.'

"But, Jim, take my advice and never enter into a partnership—not even with the best friend you have in the world. I have seen too many sad experiences resulting from partnerships.

"You see one partner is bound by the acts of any of the other partners and that is where the trouble comes in.

"For example, a minor may enter into a partnership, then he may avoid any liability to partnership creditors. Even if you are a silent partner you can be held responsible for the partnership's debts. The authority of a partner is very great because every partner is a general agent of the partnership and can bind all the members and all the property in transactions that relate to the usual business of the firm. Any partner can make or indorse negotiable paper.

"Of course, if you were a partner in a firm and heard of some transaction by the other partner or partners that you did not approve of you could stop it by giving notice that you would not share the responsibility.

"But where the rub comes in is that you may not hear of something a partner is about to do until it is too late.

"The law reads 'whereby any wrongful act or omission of any partner acting in the ordinary course of the business of the partnership, or with the authority of his co-partners, loss or injury is caused to any person, not being a partner in the partnership, or any penalty is incurred, the partnership is liable therefor to the *same* extent as the partner so acting or committing the act.'

"Stay out of partnerships, Jim."

* * *

Look at the prices displayed at the fruit stand—the choicest and best apples bring the highest price.

Look in the show window—the best clothes bring the highest price.

The best cotton brings the highest price. The best cloth brings the higest price. Then why in the thunder don't more men realize that the best men bring the highest price.

Where Knowledge is Bliss and Ignorance is Folly

Ignorance *may* be bliss and it *may* be folly to be wise—in poetry—but *not in business;* for Ignorance is the greatest of all business evils; because it is blind business in action.

Successful business *knows,* from costly experience, that Ignorance is *anything but bliss.* And that the only connection *folly* has with *wisdom* is when business has been foolish enough not to be wiser *sooner.*

Nine out of ten infirmities and failures in business are directly traceable to barren Ignorance—ignorance of trade conditions, of costs, of markets, of simple organization, system, management, control. And, above all, *blind* ignorance of the presence of a new order of things in business today—the order of *exact knowledge based on dependable facts and figures*—the order of Modern Accountancy.

Ignorance is the bandage to the eyes, the chain to the feet, of Progress. Knowledge is the wings lifting business to greater heights in human service—and so to Power and Profit.

A business that *knows itself* does not fail. A business that *guesses* and *gambles* never fails to fail.

ERNST & ERNST

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ALL KINDS OF
RUBBER COVERED ROLLS
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510 Stewart Ave., S. W., Atlanta, Ga.

"The Size That Satisfies"

Sizing Compound "V" — TALLOW, GLYCERINE, GUMS, DEXTRINE, PRESERVATIVE, WATER

Contains no Chlorides, no Mineral Salts, and no Mineral Oil.

Sizing gums and weighting gums.

. . .

Our prices are right for the quality of products.

Emulso Tallow — TALLOW, WATER

The perfectly emulsified product. Contains no Gums, Acids or Alkali.

HOW OTHER MEN MANAGE

Practical Discussions by Cotton's Readers On all varieties of Mill Subjects

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all. will be properly edited before publishing. The editors

What is the Life of a Quill?

EDITOR COTTON:

What is the life of a quill which is being used in looms making from 156 to 164 picks per minute? The goods we are making are 48 square bag goods, also sheetings and print goods.

In asking this question I would like to explain what I mean by the life of a quill. The life or usefulness of a quill is determined by two main factors: First, the number of trips it makes between the spinning room where the quill is filled up with yarn, and the weave room. Second, the speed at which it runs in the loom.

Also, the kind of loom is a great factor. In my case the looms are automatics where the setting of the battery is very important. I would like to know from some of the readers how long a quill should last and how many quills they have to replace in the course of a year on say, 500 or 1000 looms. I find that the greatest breakage occurs at the loom battery and the next cause is due to quills being run over by trucks.

W.E.(S.C.)

Causes for Loose Ends.

EDITOR COTTON:

I am really ashamed, at this late date, to answer an article that was published in the September, 1926, issue of COTTON, but this is the first time that the subject has been impressed upon my mind to the extent that I wanted to say something about this letter from "R. E. (Ga.)" on the subject of a cause for loose ends.

The strongest point brought out by this writer was that the overseer should determine whether his second hand was capable of running the second hand's job, and if not, he should get one who was capable, or words to that effect. That reminds me of the fellow who sold out and went to some noted gold fields to get rich on gold mining; failing to find the gold deposits he returned home only to find that the man who had bought his land had found gold in the back yard.

We nearly always have prospects in our mills who, with proper training, can be made into capable men for running jobs. This can be done through the coaching of a good overseer, who will teach and train them, and generally the second hand will take to it too; he will see the point and do just as he has been told. But the overseer must remember one thing: that an order is never given until the one receiving it understands it as well as the one giving it.

I do not say that this can always be done, but I will give my own experience along this line for the last twenty-five years in getting assistant overseers. I try and teach the highest man to run the job as well as I think that I could. I stay right behind him. We get together at times and go over things that might come up or that we are anticipating doing in order that he may get the idea clearly in his mind and be thinking it over. This man in turn can be teaching someone else. In this way we are all centering on one job and working in unison and are getting the third man lined up for the next step up. We have secured excellent results from this practice, and in the meantime each man lower down the line has the feeling that when certain openings occur he is in line providing he is qualified.

If we make a bad choice, as soon as we find it out we change and pick up the next promising young man. We try to make all of our men, all the way up to the overseer. We have not done this 100 per cent, but have come very near to it. Our motto is to teach someone else to run our jobs, for that makes everything run better and most everybody is working his best.

T. A. D. (GA.)

Suggests Double Carding for Sledded and Snapped Cotton.

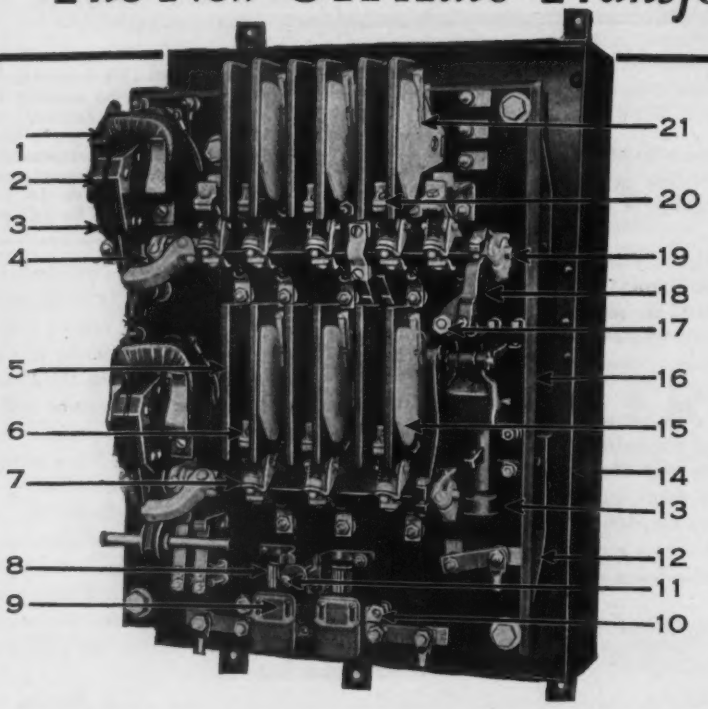
EDITOR COTTON:

So much is being said and written concerning the trouble manufacturers on low-grade cotton are having with sledded and snapped stock at this time that we are all giving more or less thought as to how we may overcome the difficulties which this stock has brought, and at the same time we are listening in for any new idea of processing which may be advantageous in handling these newly developed problems.

It is impossible to detect any appreciable advantage in any of our modern opening, cleaning or picking processes for removing the bark or small limbs which are so prevalent, and are the source of all of our trouble but easily noticed is the disadvantage caused by these preparatory processes, and especially at the pickers is this objectionable result most noticeable. If a single limb, twig or piece of bark from the cotton stalk passes under the action of the blade or Kirschner beater, it is split up into a number of fibrous pieces which because of their hairy or fibrous character cling with even greater tenacity to the cotton fibers. After the beater has done its work we have a greater number of pieces to remove, either of which is more difficult to separate from the cotton fibers than the original piece before being split up. With these facts before us it seems plausible that the less processing we can do before we reach the machine that will actually remove the foreign mat-

Keeping Step With Electrical Progress

The New C-H Auto-Transformer Starters



These Twenty-one Features Mark the High Point of Modern Starter Design

1 *Magnet coil easily removed.*

2 *Double pull solenoid type magnet—quick positive pull.*

3 *Cushioned magnet construction assures long life.*

4 *Entire switch finger assembly easily removed as a unit.*

5 *New chimney type arc shields carry arc away from contacts to prevent pitting and burning.*

6 *Contacts designed to be easily removed for replacement or repair.*

7 *Individual switch fingers easily removed for replacement or repair.*

8 *Thermal overload relays cuts motor from line only when temperature of windings becomes dangerous.*

9 *Thermal overload adjustment accurate to allow for maximum loading without danger to motor.*

10 *Thermal overload heater coils easily changed to make each starter suitable for wide range of motors.*

11 *Overload release easily reset from outside of case.*

12 *Entire mechanism complete on unit panel is supported by mounting straps—not by case.*

13 *Quick-reset, adjustable timing device gives accurate, consistent timing.*

14 *Split case design allows easy access to all parts of starter mechanism.*

15 *Heavy duty blow-out coils quickly snuff arc to protect contacts.*

16 *Ample capacity transformer has easily accessible taps to regulate starting current to 50%, 65% or 80% normal.*

17 *Timing adjustment made by simply turning this screw.*

18 *Mechanical and electrical interlocks insure that starting switch opens before running switch closes.*

19 *Switches operate on hardened and ground steel bearings.*

20 *Heavy tinned copper contacts have full roll-and-rub action. Cool operation insures long life.*

21 *Arc shields entirely removable without tools; provides for their quick replacement or repair and allows easy access to contacts.*

Built to the Standard of Millions of Operations

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ter, the better opportunity we have for efficient cleaning.

With this brief mention of the disadvantages caused by our preparatory machinery, let us consider the machine upon which we are entirely dependent for the removal of this objectionable matter—the card.

When you happen to be in any card room you don't have to ask if snapped or sledded cotton is being run, just look at the flat strips and you can assure yourself as to this. For practically all of the bark and limb contained in the original bale as delivered to the mill will be deposited here. Though the card almost approaches perfection in its duty, sufficient of the finer bark fiber remains with the stock to cause more trouble than anyone feels he can tolerate.

Reducing the production of the card improves its efficiency in this case like in all others, and increasing the amount of flat strips naturally removes more foreign matter, but we are limited here for economic reasons and within their bounds are unable to complete the results attempted.

Everyone who makes observations in the mill with the idea of determining the truth or fallacy of these statements will observe just such conditions as I have mentioned. Unless someone has a new type of cleaning machine, yet unheralded, to offer, we are dependent entirely on the card for the removal of the most objectionable foreign matter occurring in cotton today, and since one process of carding at a reasonably low production with a comparatively heavy flat strip will not give us the results desired, we are confronted with the necessity of double carding.

Double carding, of course, will necessitate the installation of sliver lap machines and additional cards, where they are now being run day and night, but with the present difference in the price of sledded cotton and such a quality of cotton as you would have to purchase to be equal in quality after single carding to the quality of the double carded sledded cotton, considerable of this expenditure could soon be offset. The additional expenditure of about one-fourth of a cent a pound for the second process, and the fifty or near percentage increase in strips, are small factors compared with the advantage gained, providing the goods produced warrant quality of finish. I would like to have some men try the figures on this. It would be interesting.

CONTRIBUTOR No. 232.

Overcoming Cockled Yarn.

EDITOR COTTON:

In the May issue of COTTON I read with interest of the report of the discussion on cockled yarn at the Union, S. C., meeting of the Spinning Division, because in many mills today, due to the staple of cotton not being of uniform length, there is to be found this same trouble.

From my own personal experience—and I have studied this problem quite a lot—I find the cockle is made at the bite of the front roll. Many times this is not due to the staple of the cotton. One mill I know of was troubled with cockled yarn, and when I investigated I found that the traverse motion of the roving guide dwelt a bit before it changed, thereby causing the roll to become creased. I put springs on every roving guide and overcame this trouble.

At another mill I found that the spinners, when taking the laps off of the front steel rolls with their hooks, did not use care and made small steel splinters on the flutes of the rolls, which, when the roving guide reached that spot, would pick up the fibers, thereby making cockled yarn. The solution of this was to use a piece of card clothing and rub thoroughly lengthwise of the flutes. I found card clothing superior to pumice stone. B. D. (R. I.)

Why Do These Shuttles Break?

EDITOR COTTON:

I should like to ask a question through your paper for my own information and for the helpful discussion which it may start.

I am having quite a bit of trouble with shuttles bursting or breaking, on the front of the shuttle at the spring end. We have Draper looms, 40-inch E-Model, running about 166 picks per minute. The power is off of the looms and the shuttles do not show any bruises or scars from rolling in bobbins, or the transferer hitting the shuttle and they are not thrown out.

We grease our shuttles with tallow on week ends. We use a good grade of shuttle made of good dog wood. I should like to know what the trouble is and how to remedy it and would appreciate a discussion on this subject.

T. T. (N. C.)

Discussing the Combing Question.

EDITOR COTTON:

Replying to the letter from "M. W. H. (Mass.)" appearing in the October, 1926, issue of COTTON, in which he states that he is very sorry to advise that I have not convinced him that a comber half-lap leaves more than 50 per cent of the combing for the top comb to do, also stating that I am very anxious for him to admit he is wrong, will say first, that is where "M. W. H." is wrong, for I believe in tolerance, but always try, if occasion calls for it, to uphold my belief regardless of what matter I may be dealing with.

Most probably I am offering so many substantial explanations for my claims and they are proving so reliable, practical and correct, that it appears to "M. W. H." that I am anxious for him to admit he is wrong. He further states that I have proved nothing to him and have not disproved his explanation. If I have not, then all I can say is that he offers very poor proof of his claims by not criticizing my statements and showing me where I am wrong. I do not mean just to state his opinion and let it go at that, but to use my statements and show me where and why I am wrong, just as I am going to try and criticize his statements in this letter.

Providing the nippers are set correctly, the amount of slippage of fibers through the nippers caused by the cushion of a bulk of cotton is so very small that it can be forgotten, for it does not equal the amount of the invisible loss on that process. This means when the nippers are closed and the half-lap is passing through the cotton, which I presume is what "M. W. H." is referring to in his second paragraph, although he does not so state.

"M. W. H." persists in saying that one fiber is the proper thing to consider to understand the comber, which is his privilege, but yet, in last October's issue of COTTON he uses six fibers. He did not have to use six fibers for my sake. What is wrong in my diagram appearing in the June, 1926, issue, which shows the passage of the lap

TERRELL

The Proof of the Saving---

Leading Southern Cotton Mill Proves Bobbin Cleaning Machines *Do* Effect Important Savings

The Textile World, on July 16th, published an overseer's report on exhaustive bobbin cleaning tests conducted in a leading Southern cotton mill.

Textile World states, "The machine used in these tests was the TERMACO Roving Bobbin Cleaner," and summarizes the tests as follows:

"Saving in labor	*$657.80*
"25% to cover depreciation, power and upkeep	*164.45*
"Labor saving less depreciation	*493.35*
"175 lbs. roving waste weekly, estimated at .015 per lb.	*136.50*
"Net annual saving	*$629.85*

"This is a return of 89.9% on the investment after deducting all charges and making allowance for all operating costs, but does not include additional savings covered by a 15% reduction in scavenger roll waste, nor does it cover the increased efficiency of the spinners which has resulted in higher production and better yarn.

"This mill employed roller pickers to clean the bobbins and the scavenger rolls, paying them at a lower rate than the spinners received. Where the spinners are performing the cleaning operation at higher wages, the savings will be increased in proportion to the wages paid."

We shall be very glad to mail a complete copy of this important report as it appeared in the Textile World, to any interested owner, superintendent or overseer who desires to cut down his roving waste.

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through the comber? Is this not correct and complete? Why does he not show where I am wrong in using a lap, or the representations of one? I think he will have to admit that my diagrams are more effective than those with his single or six fibers. I certainly did not have an individual fiber pictured in my mind when I sketched those diagrams.

"M. W. H." admits that there are many fibers which slip through the nippers when the detaching roll moves forward in its piecing up motion, and goes on to say: "But this is a thing which should be reduced to a minimum, and, if it were mechanically and practically possible, should be eliminated entirely." In the next sentence he says that I will have to admit that I would not set a comber by this slippage, but rather by the average length of staple which I am running.

In my previous letter, to which "M. W. H." replies, I did not say that the fibers slip through the nipper when the detaching roll moves forward. I simply stated that they were drawn forward due to their clinging to fibers already gripped and assisted along, and also due to the nippers swinging up to their dead point, which is as close to the leather roll as possible without striking, (No. 19 index), enabling some of the fibers that were not gripped at either end to be drawn forward through the top comb and increasing the draft. "M. W. H." may call it slippage or whatever he wants to, but it cannot be helped, and for his benefit I will inform him that it is mechanically and practically possible to stop some of it. But to do so will increase the waste percentage, and that does not go down so very well with some mill men. Some of it can be stopped by setting the top comb deeper, timing it to enter the cotton earlier and at more of an angle, feed later, nip later, feed less, knife set closer, nipper plate and feed roll set farther away from the detaching roll, etc. By doing the foregoing it means increasing the waste and not allowing the same amount of fibers to go through the top combs to the detaching rolls, thereby increasing the amount of fibers that slip by. But after so doing, the amount of length detached is just the same. I know that is the point where most of the draft is put in. If "M. W. H." were to reduce the slippage of some of these fibers by increasing his waste percentage 3 per cent, what per cent of slippage would he have eliminated? I think that he will still find some fibers that are drawn from between and back of the nippers. As I stated in the earlier part of this letter, they are drawn forward, etc., just as I explained in previous letters.

Concerning "M. W. H." saying that I will have to admit that I would not set a comber by this slippage, I wish to inform him that I will not admit anything of the kind, but I would set a comber by this slippage as he calls it, only I would call it fibers drawn forward as stated in the foregoing.

Let him follow me closely and try not to miss this point, brought up in his statements, and he will find my claim in this matter just amounts to *slippage* of fibers, only it does not sound a practical word for the point of his contention, and we do not speak of it as slippage. He admits there are many fibers which slip through the nippers. Now if he were instructed to increase the waste percentage, say 2 or 3 per cent, what would he have to do? Why set the comber so that the waste would increase the amount desired, and to do that there would have to be less fibers drawn or slipped forward by the detaching motion and more fibers taken out to be classed as waste. So "M. W. H." will have reduced the slippage of fibers, by reducing the weight of the finished combed sliver at the front of the comber, and by increasing the weight of the comber noils at the back of the comber. Regardless of how he looks at it, in figuring the waste percentage he must consider the weight of sliver and waste to find the per cent of waste made, and to increase either one or the other, he must either increase or decrease the amount of fibers drawn forward or slipped forward, as he chooses to call it.

He also states that I would set a comber by the average length of staple which I was running. Now before I answer that statement I am going to take the liberty of saying that he has never had charge of a department with Nasmith combers in it or he would not be so ready to make some of the statements that he does; also he would be able to see my claim of the top combs combing 50 per cent of the cotton more clearly. To a great extent on all Heilmann type combers the length of staple used must be considered, but on the Nasmith type combers such is not the case; the staple can be ignored to the same extent that it has to be considered on the Heilmann type. I know that this statement is going to bring some comment from "M. W. H." and other readers of COTTON who have charge of combers, but now that I have made the statement, I am going to give my reasons for the claim.

He can resort to feeding sooner or later on his comber or any of the Heilmann type machines, which practically amounts to moving the settings. After the comber is set to what is thought the best for that staple of cotton, it can always be moved a little either way with the nipper plate or feed roll settings, but the mechanism interferes with the amount of the movement.

I am perfectly aware that in setting a Heilmann type of comber the settings are more or less controlled by the staple of cotton which one may be working, but on a Nasmith comber one is not restricted as to the staple. For instance, I can set a Nasmith comber running 1¼ or 1½-inch cotton to take out a certain amount or per cent of waste, then increase or decrease that per cent by moving the nipper plate and feed roll backward or forward according to the change, and it will make no difference whatever in the length of staple run. I have set combers that have been working the same length of staple and yet had the nipper plate and feed roll set farther away from the detaching roll on some of them, because more waste was desired than on those set closer to the detaching roll, and I never had any trouble and the length of staple was not considered. I have set the feed roll the same distance for 1⅛-inch cotton as I have for 1½-inch, and then set my nipper plate and top combs according to the waste percentage desired.

I fully realize the mechanism of the Heilmann type combers and know that a man is more handicapped in setting one than he would be with a Nasmith comber and that he rarely moves the nipper plate and feed rolls back to increase the waste for about 2 per cent, usually resorting to the time of feeding.

The setting that the length of staple affects most on a Nasmith is the feed, and the same can practically be said of the Whitin or Heilmann type, for when the nipper plate is moved either way on the Nasmith, the feed roll follows the plate, but on the Whitin or Heilmann type the nipper plate can be moved without disturbing the feed rolls, as

THE "WHY" OF KONDU THREADLESS FITTINGS

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KONDU BOXES GIVE A NEAT APPEARANCE TO THE FINISHED JOB.

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SCREW HOLES IN BOX SO PLACED AS TO ELIMINATE CONTACT WITH INSULATION.

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A TYPE FOR EVERY NEED. SPECIAL THREADLESS TYPES FOR KNOCKOUT BOXES, 90° BENDS, FIBRE TO IRON CONNECTIONS, COUPLINGS, ETC.

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the latter are on fixed bearings, independent of the nippers and need not be moved unless the feed rolls are very close to the nipper knife or conditions require it.

In the explanation given by "M. W. H." showing where he thinks I am misled, I am not saying to myself: "That bird thinks a picker or a card is a comber," and I am fully aware that the nips are figured by the inches fed same as on a picker or card, and I never said otherwise. If "M. W. H." will only look over any of my previous letters he will find that I said that "a great many men jump to the conclusion that because they are feeding 1/6 or ¼ inch that every inch of the combed sliver on the table has been combed by the half-lap six or four times." But I am smiling to think that he is comparing a picker and a card to a comber to help support his claim. I notice he said nothing about the feed rolls on the pickers and cards continually feeding cotton to the beater and licker-in and the latter two continually taking away the cotton as they revolve. "M. W. H." must remember that the cotton is fed intermittently, combed intermittently by the half-lap, and last but not least, while the half-lap is combing the tip of the lap, the latter is gripped by the nipper and gripping some part of the length of those fibers that are being combed by the half-lap, for the simple reason that the half-lap would pull the cotton from between the nippers and feed roll or rolls if it were not gripped securely.

I would also remind "M. W. H." that I did not say the detaching motion jumps back and grabs the ends of the fibers and snatches them away from the bite of the nippers and feed rolls. The word jump was not mentioned, nor did I mention that the fibers were snatched from the bite of the nippers, for the simple reason that the nippers are open when the detaching roll and segment are drawing the fibers forward. He must not read my letters carefully, or he would not misquote my statements.

He asks what I consider a good draft on a comber. Well that depends on the quality, production, cotton and make of the comber. It all simmers down to what weight lap the make of the comber will work to the best advantage on the quality of the work desired. The length of the detaching motion is the same at all times, regardless of whether detached earlier or later. The greatest draft occurs between the feed roll and table calender roll, and the next is in the draw box, and in the June, 1926, issue I mentioned the draft between the feed and calender rolls. Also, I was perfectly aware of this draft when I put forth my claims on the amount combed by the top comb. I also understand paragraph No. 7 in his previous letter, for I stated what he really meant.

In presenting the diagram in paragraphs 10 and 11 "M. W. H." says: "Theoretically, it figures that the half-lap should pass through each fiber six times, and therefore I have shown six fibers as they lay coming through the nippers." What he theoretically figures, however, does not practically occur. He has tapered the figures so that they are 1/6 of an inch in advance of each other, with No. 1, the top one, the farthest advanced. Of course that is just for illustration as the fibers on a comber do not lay in that manner with the farthest advanced fibers on top of the lap. When the lap is about to be gripped by the detaching roll and segment on the Whitin, and the detaching rolls on the Nasmith, the feed rolls feed the amount that either of the combers are set to feed.

"M. W. H." says: "The whole argument simmers down to the question of whether the detaching motion grabs the fibers and pulls them away from the nippers, or whether it has the fibers fed to it as my combers are set to do."

I do not care how he has the combers set for feeding the fibers to the detaching motion, but if he has the Whitin combers (I do not mean Model E. Nasmith type or the Model D-3 comber) he cannot set them to feed the fibers to the detaching motion like it can be done or in as smooth a manner like it is done on a Nasmith comber, for when the detaching roll has to strike the segment and at the same time grip the fibers, he must admit that it is a sudden action on the fibers, especially when considering that the detaching roll must have attained the same speed as the cylinder or segment when it strikes the latter. Probably he is feeding earlier and that gives him the impression that he is feeding to the detaching motion, or feeding very late so that the roll strikes the segment before the feed starts, but I am afraid that he dare not feed so late if he respects the production.

Following are some of the advantages claimed for the Nasmith detaching motion over the Heilmann type combers, and never disputed so far as I know: 1. The time available for detaching and drawing through the top is greatly prolonged. 2. The top roller is as easily set as a drawing head roller, doing away with the delicate adjustment. 3. No definite and fixed surface speed of the roller is imposed, and a smooth cam takes the place of the abrupt notch wheel cam. 4. The shock and deflection of the leather roller dropping on the cylinder under the influence of weight is done away with, and a 25-pound weight easily works a 10½-inch lap of 600 or 700 grains per yard. 5. A long overlap and perfect piecing are obtained even with ⅞-inch staple.

In paragraph 12, "M. W. H." says the explanation is all right in paragraph 4 of my letter in the June, 1926, issue of COTTON. I also notice he is acknowledging the "slippage" of the fibers as he calls it. Figuring from my settings, I find that I have more than 1/6 of the fibers advanced far enough to be gripped by the detaching motion and they are finer graduated than 1/6 of an inch. Some are advanced only 1/64, 1/32, 1/16 and ⅛ of an inch and so on in front of others, and probably finer than that. He cannot make me believe there is one inch in length of fibers that is combed by the half-lap when only feeding 1/6 of an inch at a time. I do not believe he admits that is so himself. Neither do I believe that when the tip of the fringe will have about 1/6 of the fibers advanced far enough to be gripped, the other 5/6 will not reach to the bite of the roll and segment.

In paragraph 13 "M. W. H." goes off again, making a comparison this time between the comber and ribbon lap machine. Well, let's see what I can do for him on this comparison that he uses as a support of his claims. He quotes the setting of the feed roll to the detaching roll and asks what kind of a web would be made at the front of the ribbon machine if any two rolls on it were set that distance and they gave it a draft of 11 at this point. If he were to set those two rolls as he was kind enough to suggest, it would mean that to bring a web out on the front of the ribbon that one roll would have to draw fibers from the other the distance of the setting. He will have to admit so much. Does the steel detaching roller that the feed roll is set from draw the fibers the distance that is between them? No. And he will admit this too. When he sets the feed roll for a certain length of cotton on a Heilmann type comber, it is set from the detaching roll. When the

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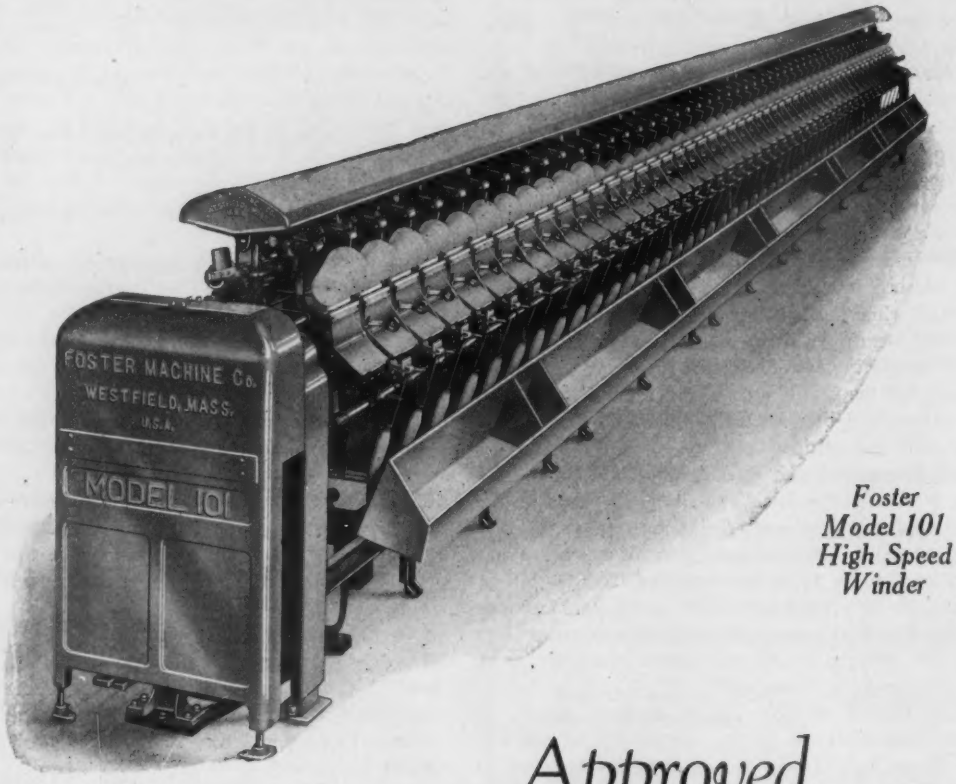

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WINDING

drawing action takes place on this comber the leather detaching roll draws the fibers forward by gripping them as the leather roll strikes the segment on the cylinder barrel. And the *distance* from the bite of the roll and the segment is *closer* than the distance between the steel detaching roll and the feed roll. I think that is sufficient to settle the argument between the ribbon lapper and comber. Also there is that intermittent feeding and detaching or drawing on the comber in comparison to a continuous drawing on the ribbon, also the penetration of the top comb into the cotton immediately that the tip of the lap is gripped must be considered.

"M. W. H." asks me the question, if I had to have either the top combs or the half-laps removed, which I would rather lose. Why, the top combs, of course. The comber can be run without the half-lap, but the sliver would be very lumpy and not fit to draw on the drawing head. He states: "If the top comb did the greater part of the combing this experiment would be possible." "M. W. H." must remember that when running without the top combs, the tip of the lap, when presented to the detaching rolls, or roll and segment, is in practically as good a combed condition as when the top combs are working, for the seventeen or twenty rows of needles on the half-lap according to the make of the comber, still comb the tip of the lap.

Regarding the dyed fiber experiment, he suggests that I put on individual black fiber on a lap at the feed rolls, just entering the bite and parallel to the other fibers and then turn the comber by hand, counting the number of nips it takes to get that fiber through the delivery rolls, and then give a report of the results produced. Does he really think that is a fair test to start counting the nips when the fiber is just entering the bite of the feed rolls, for the tip of that fiber has to travel from the feed roll to the bite of the nippers and be protruding about ⅛ of an inch before the half-lap has a chance to penetrate the fiber or fibers. If that is what "M. W. H." did in his experiment, no wonder that he is under the impression that the half-lap passes through each fiber six times.

Well, here are the results of my experiment, and I tried it putting the fiber on the top, middle and bottom of the lap. The tip of the fiber was between the bite of the nippers while the half lap was combing the tip of the lap, and when the tip of the lap was gripped by the detaching rolls and the fibers drawn forward, the colored fiber was drawn forward a little but not into the bite of the rolls, so when the nippers closed there was about ⅜ of an inch of the fiber to be combed by the half-lap, and after the half-lap again combed the tip of the lap and the tip of the latter was gripped by the rolls, the fiber was drawn forward into the combed sliver, showing that the half-lap treated that fiber only once and not four times, as I am feeding ¼-inch.

I tried it, putting a number of fibers together, just to show that I am not taking the attitude that there is only one way, being quite willing to give his suggestion a thorough tryout. It took one nip of some of the fibers, and on others two nips. The reason it took two nips for some of the fibers to get through was for the simple reason that some of them were not drawn or assisted as far forward as the rest. But those fibers that were drawn through at the first nip were a little in advance, due to the detaching action of the previous nip. That is a fair and honest report and is what I expected. The proper way to take the test is to wait until the fibers are under the bite of the nippers before starting to count the nips.

At the end of his letter, "M. W. H." says: "I cannot say that the half-lap combs more than 50 per cent of the fiber. While all such figures are theoretical, I am willing to believe that the half-lap combs 90 per cent."

Following are some questions I would like to have "M. W. H." answer:

1. Why do combers start feeding just before the detaching commences?

2. After the feed rolls or roll have finished feeding, and the detaching rolls, or roll and segment, start to draw the fibers forward due to the detaching motion, does not the lap from the bite of the feed rolls or roll to the end or tip of the lap get pulled tight or evened or straightened out, due to the fibers being drawn forward sort of drawing or dragging on the lap; and can you not see some of the fibers being drawn forward that have scarcely been touched by the half-lap?

3. Why do not combers feed heavier than they do, if the half-lap passes through the cotton six times to the inch when feeding 1/6 of an inch, or as many times as there is the amount fed to the inch?

4. Why feed later to increase the waste percentage on the Whitin comber?

5. In increasing the waste percentage without changing, or changing the time of feeding, and with the nipper knife set as close to the half-lap as possible, say 25/1000, which is as close as required on any class of work, which must be depended upon to help in increasing the waste two per cent, the top comb or the half lap? How is it done or increased?

6. What is the distance from the *lip* of the nipper plate over the edge of the latter to the needles in the half-lap?

7. Of the length of the fibers or sliver drawn forward, due to the detaching motion, which contain the most nep, the front half of that length or the back half?

8. If the half-lap passes through each fiber six times as "M. W. H." says, and illustrates in his diagrams, then why have we so much neppy yarn? Why is it necessary to double comb some cotton to get the desired quality? I am sure that one of the reasons is because of the per cent of nep after first combing. Another is to get a more even-stapled combed sliver to spin the finer numbers. Why take out such a large percentage of waste from some good cotton that is combed?

9. What causes "M. W. H." to think that only the farthest advanced fibers are gripped and drawn forward? Is it because of poor piecing?

10. How far on the tip of the lap does the detaching roll grip the fiber when the roll strikes the segment?

I can answer all of the foregoing questions, and I should like for him or others to do the same, for the purpose of trying to prove my claims.

I will not say that I hope my letter has convinced "M. W. H.," or anyone, but I will say that I trust he and others find it of some value and interest.

JOCK (MASS.)

Whitin Machine Works, Whitinsville, Mass., have recently issued two further booklets descriptive of different products—one devoted to the new Whitin Model D-3 comber, and the other showing the company's bale breaker.

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White Finish for Blue-Grey Sheeting.

EDITOR COTTON:

We would like to know how to secure a pure white bleached finish on a regular 2.85 yard grey sheeting. A sample of the goods is enclosed for the examination of anyone who may desire to answer the question. You will note it has a blue-grey cast. CONTRIBUTOR NO. 825.

Cone Belts.

EDITOR COTTON:

In the March issue of COTTON "C. C. (N. J.)" begins his article entitled "Cone Belt for Fly Frames" as follows: "Seems to me I read an article sometime ago in the discussion department by a contributor who claims that a special cone belt is necessary on the bobbin lead frame."

Seems to me I wrote it!

Yes, the cones were driven on a bobbin lead frame by a belt long before the new double type belts were thought of. But why were the double belts thought of?

The answer is, that the single belt was not equal to the task. If the single cone belting gave the results, why the change? Single cone belting on fly frames has been and is, a source of trouble to this day, and "C. C." knows it. Can he deny that on the market at the present time there is laced canvas, rubber and canvas, double belting, etc. If a song were made up of a fly frame cone belt it would sound like the Irish Jubilee.

Get the last lines of his article "Ever notice how it (the cone belt) wears on the side through constant friction with the cone belt shipper before it breaks?"

Now study what happens to a cone belt from the start to the ending of a set of roving. At the start of the set on any bobbin-lead fly frame, owing to the bobbin-leading, the cone belt is called upon to drive the bobbins at their maximum speed, when the ratio of the top and bottom cone is at the worst point of the working area of the cones. That is why the cone belt slips more at the start of the set. The shipper is made about 1/2-inch wider than the cone belt to be used to make up for this defect.

When the cone belt slips, it works itself laterally to the small ends of the bottom cone and against the shipper, which of course causes friction. Next, when the cone belt grips the bottom cone, it works back to the high sides of both cones, and there is more friction. When the cone belt is on the center and past the center of the cones, the friction is less, due to the change in ratio. However, this proves that the cone belt is overworked and breaking continually, whether a single or double belt is used.

The cone belt drives the bobbins and receives no aid from any other source. I am surprised that so many mill men are blind to the fact that when the sun wheel is standing still no winding takes place. Well, the cone belt operates the sun gear. In order to prove that the cone belt only drives the bobbins during winding, make the following tests:

Raise the bottom cone and turn the frame by hand, and it will be seen that the bottom cone will turn in the opposite direction to that of winding, if not checked. What causes this?

The answer is found by disconnecting the sleeve gear or sun gear from the gearing to the bottom cone. When this is done, it will be found that the sleeve or sun gear will revolve in the opposite direction and the bobbin gears are stopped. Next, with the frame stopped, turn the bottom cone and the sleeve gear or sun gear will rotate around the fixed gear on the driving shaft and the bobbin be made to revolve.

Now it should be seen that the same conditions exist when the frame is up to speed. We drive the bobbin and spindle together, or rather at the same speed, in order to put in the twist. All the winding is done by the bottom cone. Consider the spindle and flyer as standing still, and we will assume that the roving will draw through the flyer without twist and without breaking. Then the bottom cone only, would need to be revolved. See the point? There is no argument on the subject, only these fellows defending the bobbin lead system are a bit confused. Allow me to repeat. We drive the spindle and bobbin to put in the twist, and revolve the bottom cone to wind-on.

WASH (R. I.)

Drop Wires at the Slasher.

EDITOR COTTON:

The writer desires to make a few comments on the article headed "Using Drop Wires at the Slasher," by "S. T. H. (Mass.)," published in the March issue of COTTON.

In the first place, this is not a new trick as it was tried out nearly forty years back at the Slaterville Mill, Slaterville, R. I. They had just completed the change-over to slashing and long chain beaming from short chain and pin beaming, Allen Campbell being the overseer. Coarse colored goods were made—stripes and checks—some with repeats of two ends of various colors and whites. They had a wire stretched across the slasher about two inches behind the raddle or expansion comb. I was visiting Mr. Campbell at that time and saw the tender laying in the set at the front after he had counted the pattern into the comb, then he took a handful of wires, something like hair pins, and placed them astride the stretched wire rod previously mentioned and between the threads desired to be kept separate. It took considerable time to get going—a good deal longer than we could afford these days—and as then used was a poor arrangement and not a success by any means.

I told the overseer that the best way to do pattern work with a broken pattern was to beam his pattern or colors somewhat different, place the section beams according to the kind of laying-in intended at front and use two flat steel rods on the front of the comb, floating from the comb but not touching the spreader bars. The dents having as many as four colors can be taken care of—the colors are coming from their respective sheds run through one dent through these rods in lease fashion onto the loom beam—showing the pattern just as it will appear after being woven into the cloth. The writer is not making these statements just to be saying something. This latter system was very much used in gingham and ticking mills throughout New England and has been all these years. Also, it gave good results.

The writer's last position in the East was at a large mill in Connecticut, making very fine tickings and having a good many automatic looms. This was 25 years ago, and one weaver was running 14 looms of these patterns, 5 harness, and weaving cut after cut without one warp end coming down.

Going back to the first section of this article, to my

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mind it is very radical. I wonder if the contributor ever saw an old dressing machine in operation? These machines have been out of use for over forty years in this country, but are much in use in the fine mills in Scotland and on the Continent. Do we understand "S. T. H." to be speaking of only one kind of machine, when he says that it is highly improbable that the slasher of today can ever attain to the perfection that obtained when using the *dresser or tape slasher*? We know that before the time of the slasher, warp dressing on white work was done with cold size using hot air from steam heated hollow castings, two size boxes, yarn brushed, and while it was slow and expensive it was a great improvement over the system used by the old hand loom weavers who had to dress their warp in looms about one foot at each time, dry it with a fan and then weave it up and repeat. As I understand it, the first slashers were built by Howard and Bullough, and the idea of taping or putting the beams in a creel, all running from the top, was not thought of then.

It took a Scotch brain to evolve taping, and even at that the hook and block lease reed had not been invented. The old dressing machines used a set of loom harness to get their leases with. One cylinder machines were much used in Scotland on fine muslin work and ginghams. The operator used a plain deep reed to twist the sets into and the leases were hand picked when the beams were doffed. As to the invention of the block lease reed, the story is told of a Scotch tape dresser who while not paying attention to the boiling of the size box went to cut the steam down, then finding that the size had splashed onto the reed and stopped up some of the dents at places he discovered by lifting the yarn up or down, it showed somewhat like a lease, and from that little incident came lease reeds of many kinds.

I cannot agree with the statement "S. T. H." makes where he says it is impossible with the old style comb to make for instance a 2 x 2 mixed stripe, blue and white. A statement of that sort shows inexperience in making fancy warps. A 2 x 2 would be considered a "snap" with the coarse raddle and lease rods, and is done every day with a double row comb, but I prefer a coarse comb and the flat rods on broken or all-over pattern work on slashing.

Another strange thing. Exactly 46 years ago the Amoskeag Company and one or two other mills had introduced the Scotch system of long chain beaming and put in one-cylinder tape dressing machines and got a good start, but it was only a few short years when they got the idea that the patterns could be laid-in, slashing style, using the striking comb to draw-in with instead of using the tape lease reed.

Another instance: the Lorraine Mills continued from their inception of colored work (from about the same period as quoted in the foregoing) to tape dress up until about 25 years ago, when they discarded the most of the leasing or taping and put their sets in slashing style. Those at the head of the mills mentioned never have, nor do they at the present time, run their business in a slip-shod fashion, but they try everything in the most up-to-date style, and let me state that these two concerns, as far as good management and business are concerned, in my opinion, have no superiors and few equals.

Speaking of using a 700 dent comb, making handkerchief goods 52 inches wide—the construction not given—assuming a man was using all 700 dents, 6 in dent = 4200 ends, probably eight section beams in the set.

I wish to dispute the statement that it would be entirely impossible to duplicate such warp constructions unless slashed through a 700 comb using the drop wires. The same set can be put through a 525 dent comb, old style, any make, eight ends in the dent, sections put in the creel as two separate sets and laid in four ends from each half or set in the dent, using the flat lease rods all across, and instead of drop wires where the blue and white comes in, use the lease. But one must know how to warp or beam the colors. Whether blue should be on only one or more beams depends entirely upon the reeding of the patterns. A set, whether plain or pattern, when they get to be from 3500 ends and up, when laid in this fashion by some one who knows how to do it is to my mind much nicer than trying to put fewer threads in a very fine comb, and as even a loom beam as on any fine patent expansion comb results. Again, the above set can be made with a half and half 2 x 2 blue and white, 4200 ends, 4 beams blue, 4 beams white, if one knows how to place the section beams in creel. In this case I'd place the beams as four separate sets to get the best running and laying-in at the front. This can be done much better than placing all the white on front bottom. Alternate with two beams of each color. When running sets this way there is less danger from breaks caused by knots and snarls than when running six ends in a fine comb.

To the writer's mind, the slasher of any make today, with the proper tender and an experienced overseer, can make warps that are better in all respects than dressers or even taping in their palmiest days, and with more production.

I believe "S. T. H.'s" article will draw much good comment and that we'll all learn something therefrom.

MACK (GA.)

Card Stripping.

EDITOR COTTON:

I thought that we had heard the last of this difference of opinions regarding the best method of stripping cards, but on my persual of the discussion department of the October issue of COTTON I find that "Wash (R. I.)" informs us that he "knows" the best method, and he seems very decided about it. Of course he mentions other great improvements, which he championed, one of which was that flyer-lead frame he is always telling us about. Anyhow, we are all waiting for the sketch of the beltless fly-frame which he promised in the September issue, and probably our knowing friend "Wash" will be surprised when he learns that there is already a design of a similar character, if not better, in the hands of the proper authorities, and when the time is propitious, the readers of COTTON will have the pleasure of pouring fourth their opinions regarding it.

However, all the foregoing is only by the way, and I wish to deal with the card stripping business for the last time, and at least put our friend "Wash" on the right track, regardless of the experience and the expert knowledge that he claims to have, as several statements I have read recently in our journal have been very misleading, not to old timers, but to the young fellows who are out to learn from these discussions.

"Wash" ought to realize that this department is not

for the purpose of claiming superior knowledge over other men, but simply to give that little knowledge we all possess on various subjects to our friends who read our vague efforts.

In his letter "Card Stripping and Strippers" in the October issue, "Wash" gives us a test, the result of which he considers detrimental, because having a clean brush at the first stripping, he finds on the next stripping that the brush has collected a great amount of "matter", he says, probably he means dirt. Well, certainly, what else can happen? If only the stripping brush is in use without a vacuum attachment which takes all that "matter" away.

Probably "Wash" is using, or has been using, just the stripping brush, and has not yet seen the system I have mentioned, though this is not the vacuum system which he champions so strongly.

All that collection of matter he mentions is bound to occur, especially if cards are not stripped at the regular times. There is a mill of which I have knowledge where they strip cards only twice in ten hours instead of at least three times regardless of the fact that they are supposed to be ca rding low American, Indian and China cotton. They also run their doffers with a 32 or 34 barrow gear. So if, as I have said before, cards are not stripped at specified and regular times for the grade of stock being worked, we will most surely find the "matter" that "Wash" tells us about.

In another paragraph "Wash" states that "an untold amount or dirt" is always being carried against the wire points while the stripping brush is in operation, thus damaging the points. If "Wash" would only think before he makes such a statement!

Now, first of all, there ought not to be an "untold" amount of dirt on the wire, as I stated previously, but even so, it is impossible to nail the blame on the stripping brush for robbing the wire of the fine points, because when the brush is used by good card strippers it is only in operation on each card for a few seconds.

"Wash" should understand that the stripping brush when properly clothed with the correct number of wire suitable to the numbers of card clothing proves a valuable asset to a carder or grinder, not only as a good stripping medium, but as a burnisher, and if regular grinding is adhered to—not one per day or per week—that fine point will always be kept up to correct pitch. We have 300 Saco-Lowell cards which are running night and day, and we have them stripped by the brush every three hours and no later, because the grinders are commissioned to attend to this point especially and the strippers are always on the job at the appointed times. But of those 300 cards there are 24 being ground and set every 23 hours, as we have day and night grinders.

The stripping brush does not bother us at all, but helps to keep our sliver absolutely clean, or we pretty soon hear from the boss comber.

Another fact is, that most of our cards are running with an 18s barrow gear. This may sound pretty slow, but we don't allow that "untold" amount of matter to get into the wire, and this is in one of the best mills of America, if I do say it as shouldn't.

In conclusion, I would like to offer a word of praise to "Jock (Mass.)" for his excellent letter on "Card Setting and Stripping" in the September issue. "Jock" always tells us something, and this is what I like about his letters. He always imparts some useful knowledge to whom it may concern.

REX (R. I.)

Answers to Spinning Questions.

EDITOR COTTON:

In looking over my file of COTTON, I noticed an article including some questions which, so far as I could find, have remained unanswered until now. This article was under the heading, "Traveler Circles and Other Spinning Questions", signed "Bert (R. I.)", and published in the September 1925 number of COTTON. Without any further preliminaries, I will endeavor to answer some of these questions.

He asks first as to single and double flange rings, width of flange, advantages and disadvantages of No. 1 and No. 2, estimate of life of service, etc.

I believe that the type of ring, that is whether single or double, will always be one that will create a great amount of discussion. From my experience, I would give preference to the single flange rings, because on 30s and higher numbers the life is quite long and the rings as now made soon pay for themselves. In turning rings, unless it is possible to turn the ring rail without disturbing the ring, especially on small diameters there is always a tendency to injure them in handling; the flange which is underneath has a tendency to collect dirt, gum and rust, and these are always detrimental to the best running, sometimes it being impossible to remove all rust. On coarse counts the reversible rings are preferable because they wear much quicker due to the action of the heavier traveler and are changed or turned much sooner than the rings on finer counts. The length of service of rings will vary greatly in different mills, even on the same counts, and even in the same organization under the care of two or three different men, due to the care given them. There is another advantage to single flange rings which is not considered, possibly not known to some. There are a great many operatives who turn rings without the knowledge of the overseer, when double flange rings are used. Sometimes a spinner is given some trouble at one spindle, after numerous piecings she decides that something needs to be done; she changes the ring and invariably the end stays up. When the order is given to turn rings, all are turned and it is found that a number of spindles are giving trouble and much time is lost in trying to solve it. This is an actual happening.

The next question is which is preferred, plate or cast iron ring holders. The advisability of using plate or cast iron ring holders will be determined somewhat by the counts of yarn to be spun. Cast iron holders would be advisable for yarns up to 10s. On finer count yarns the plate holder will do all necessary. From my observation, I cannot see but what the plate holder holds the ring as firmly to the rail as the cast iron holder. One tendency of the plate holder is to be bent in handling, especially where a great number of sizes must be kept on hand for spinning various counts. The cast iron holder having only one screw will always be set in relation to the rail. The plate holders being so much lighter than cast iron will require less horse power to move the rails and this item will mean quite an amount in saving in a large mill and needs to be considered.

"Bert" next asks what policy is best on ring replace-

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ment for worn or cracked rings. In the replacing of worn rings the best plan is to change a whole frame, for in this way it is possible to keep the frames uniform in traveler numbers and to keep a correct record of the time the new rings were started and where they are located. This record of date and number of frame should be filed where it can be found when wanted. I have known of men who always file the date and other data, but never can find it when it is wanted. It is not very likely that more than one or two cracked rings are found on a frame, and when they are the new ones should be placed at one end so that they may be attended to properly.

As to the advantages of burnishing rings, we do this when they become rough or spotted with rust. This we do by putting light travelers upon them and changing to heavier weights until the ring is highly polished. This clears the rings and puts them into the best condition for running. Any other way of polishing them will destroy the object sought.

I endeavored to answer the next query, "What is the opinion of changing rings over?", in answering the first question. His next question asks about changing travelers.

The travelers on 10s to 40s should be changed at least once a month; 40s to 70s, about every three weeks; on 70s to 100s, two weeks is long enough. This is for regular work; if any yarn is on hard twist it will be necessary to change the travelers much more in a given time. The reason for changing them is that they will have begun to wear in this time and should be replaced before damage is done to the yarn. Too much care cannot be given to traveler changing. Many overseers are not on their jobs and neglect to follow this closely, leaving it to others. The best method to use is to have a given number of frames changed each week, this does not cause too much loss of production at one time, it is systematic, and everybody knows what must be done.

The next question is, "What system of spindle setting is employed in the spinning room. Who is responsible? Are frames set in rotation, or here and there? How long will a frame run before needing setting?" The majority of mills with which I am familiar make a practice of setting spindles at least once a year. The overseer of course is responsible for all of the department, and he must determine the time to start and should follow the work to see that it is being done satisfactorily. This he does himself or sometimes delegates to his second hand. There are some mills where the consent of the superintendent must be given before this can be started. The proper method to follow is in rotation. In this way the overseer is always in touch with the work at all times, and is better able to keep track of the number completed each week. Some mills, with 60,000 spindles or more, have a spindle setter going all the time; the time consumed in going around being about the same. In some mills there are usually some third hands who are exceptionally good at spindle setting, and when it is time to start they are put on this particular work and other third hands hired to work for them until this work is completed.

"Bert" asks next, which is preferable, the round or square point traveler. He also wants to know our experiences with breaking in new rings and changing over old ones. I personally prefer the square point traveler because it holds to the ring better and gives longer service. It has been found that the round point traveler has a tendency to, and very often does cut a groove in the ring. This of course weakens the ring and causes it to become troublesome when new travelers are placed upon it.

Comparative experience with the flat top and round top travelers are next requested. I have been looking over quite a number of the different makes of travelers and have examined them under a glass, and all I found were the same. They appeared flat on top until the power glass enlarged them, and then the corners and sides were seen to be nicely rounded.

As to the probable causes of "wavy" rings, I should attribute this trouble to very uneven yarn, this causing different tensions on the traveler during the running of sets.

"Is as light or as heavy a traveler as possible run, and why?", is the next question. As light a traveler as possible should be run as this does not put any undue strain on the yarn. I have found from experience that the traveler has its effect upon the breaking strength, and the traveler that runs light enough without too much balloon will give the best results.

As to systems of roll weighting, and the amount of weight necessary, all that I have been acquainted with are lever-weighted—so arranged that one lever and weight exert all the pressure needed; these are of course somewhat adjustable. I have had but little experience with self-weighted rolls and cannot accurately tell of the advantages and disadavantages. The amount of weight needed is determined by the gauge of the frame, and the count of yarn being spun and the length of stock used. I might give what I am using and these would not be advisable for others. The best method is to experiment.

"What is the opinion as to the three top front lines of rolls weighted as against the back and top rolls weighted, the middle roll being self-weighted; or as against the front weighted, with the middle and back rolls self-weighted?", is next asked. On some cottons, best results are obtained by running the middle roll unweighted, yet I have known some overseers to run all of the frames without weight, irrespective of the stock. In running some experiments I have found that on certain cottons I had the best results with weight on all rolls, and on others with the middle roll unweighted. I suppose that the reference to the middle roll being self-weighted refers to such rolls as the Hinds metallic roll and the leather-covered wooden roll. Good results may be obtained with the Hinds roll on cottons up to 1¼-inch, provided that the surface speed of the middle steel roll is increased to give a draft of 1.25 to 1.30 between the back and middle rolls. The leather-covered wooden roll has not proven successful on short cottons, but on cottons 1¼-inch and longer very good results may be obtained. In using both of these rolls, best results are obtained by closing the spacing between the front and middle rolls to the touching of the cap bars.

The questioner next wants to know what break draft is advisable with all top rolls weighted or with only the front and back top rolls weighted; and with only the front top roll weighted. The usual break draft on spinning frames is 1.07 or 1.09. The question often arises, is this the best? Most of us do not know. We take the recommendations of the engineers at the shops. Invariably this draft will be the same on all makes of frames. I may have something to write later about this, as I am now

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experimenting with it. I stated in a previous paragraph that 1.25 to 1.30 gives very good results with unweighted rolls.

He next asks what roll settings should be used under the following conditions: three top lines weighted; front and back top rolls weighted; only front top roll weighted. When the three top lines of rolls are weighted, the settings should not be closer than 1/16-inch over the length of the staple used on counts from 30s up. When coarse counts up to 20s are being spun, this should be 1/8-inch over the length of the staple used. When the middle roll is the common leather-covered roll and run without weight, the setting may be closer than with a weighted roll. With the Hinds or the leather-covered wooden roll, the setting will be as close as the rolls will run without rubbing. Self-weighted rolls need the same setting as weighted top rolls.

Then "Bert" asks about what system of scouring frames in the spinning room is employed, when it is done, and how often it is necessary to scour a frame on coarse, medium and fine counts. The system of scouring mostly used it to take out all the steel rolls, scrape and polish the roll stands, and clean the steel rolls with card clothing. This clothing gets to the base of the groove and loosens all gum and dirt. Then wipe off the rolls and polish with whiting. This will absorb all grease stains left after cleaning the rolls. The rolls are now ready to replace, first one drop of oil should be put on each bearing in the roll stands, the rolls put in and some hard grease put on the necks of the back and middle rolls. This grease must be hard, otherwise the natural heat in the spinning room will cause it to run, and it will spread on the steel rolls and cause trouble. The hard grease will keep the necks and bearings well lubricated. The ring rails should then be taken off and washed with kerosene. This has proven the best wash as it cuts into the grease and gum that naturally collect. After washing and wiping the rails and rings must be polished with whiting for the same reason that the steel rolls are polished. The lifter rods are then taken out and cleaned and the bushings through which they pass are scraped and polished. It is surprising the amount of gummy material that collects here. The rails are now ready to replace. The gearing in the head must be looked over carefully. Unless I here mention the spindles somebody will tell me that I have neglected an important part of scouring. I believe in doing it thoroughly. The spindles should be taken out during the time the rails are off, the bolsters cleaned and re-filled with clean oil. To my mind this is the ideal time to set spindles.

"What humidity should be maintained in a spinning room? Actual grains? Relative per cent? At what temperature? When the room heats up to 90 to 105 degrees F.? What are the results of high temperature on size and break? What difference does this heating up have in different yarns of coarse and fine counts? What humidity should be maintained for coarse counts and what for fine counts?" This is the next set of questions propounded. Parks-Cramer recommend 7 per cent regain for the spinning room. This is the lowest per cent. It will prove very good provided the room is not on hard-twisted yarns. When making voile or crepe yarns, it is much harder for the moisture to remain in the yarn; it seems that the twist pushes the moisture out. I have never tried to keep records of actual grains but have always worked on relative humidity and regain. At a temperature of 70 degrees this would be about 60 per cent relative humidity. At 85 degrees the wet bulb should be at 75 to give 60 per cent relative and 7.64 per cent regain. At 95 degrees the wet bulb would be at 83 or 84, this will give about 63 per cent relative and 7.75 per cent regain. When the temperature reaches 100 the wet bulb must be kept at 90 to retain the 63 per cent relative and 7.75 per cent regain. High temperature without proper humidity will cause the yarn to size light and break weaker, this being caused by the heat absorbing the natural moisture of the cotton. The heating would cause more trouble on coarse than fine counts because the coarse counts having less twist and more bulk would not hold the moisture so readily as the finer counts. I would advise a relative humidity of between 65 and 70 per cent for coarse counts and 70 to 75 per cent for hard-twist yarns. After reaching 75 per cent relative humidity, the moisture begins to cause trouble by licking rolls.

The next question inquires as to the system of oiling, and how often spindles should be oiled. Oiling is one of the most essential points to follow in any department, the lack of oil causing parts to run hard and unsteady, and this unsteadiness will cause many ends to break frequently and upset the morale of the help. This will also cause excessive use of coal to keep up steam, due to each frame requiring more horse-power to run it. This is very costly and needs watching. Fast motions should be oiled twice each day; slow motions once a day; rollers every day; spindles once a month.

"Bert" then wants to know how long, with proper care, bolsters should last. This is really a question that is hard to answer. We find that bolsters are replaced here and there and that in practically all cases the fault is with the care of that particular bolster. It is very easy to skip a bolster when oiling spindles.

The final question which I shall answer inquires as to the advantages and disadvantages of tape versus band drive as to uneven twist, etc., and how weather affects a tape drive. We know that more uniform twist, spindle for spindle, is obtained by a positive drive, as the tape drives four spindles, this in itself will reduce the chance of variation, but as each tape has a tension weight which exerts a pull at all times, this being very near equal, the tendency of variation has again been greatly reduced. We know from our experience that where spindle bands are put on by hand, the chance for variation in tension is exceedingly great and therefore the twist variation, spindle for spindle, will be very great and the variation much in excess of the tape drive. When the Cook-Taylor band tension device is used all bands are put on at the same tension and the twist then is much more uniform. The weather will affect the band much more than the tape as the softer material will both absorb and lose moisture much more quickly than the woven tape. The tension weight on the tape acts as a compensator always keeping about the same tension on the band regardless of the weather condition.

I like the idea of these questionnaires and I have answered these question as I see them. I hope some of our readers will criticize these answers and in this way

(*Continued on page* 1249)

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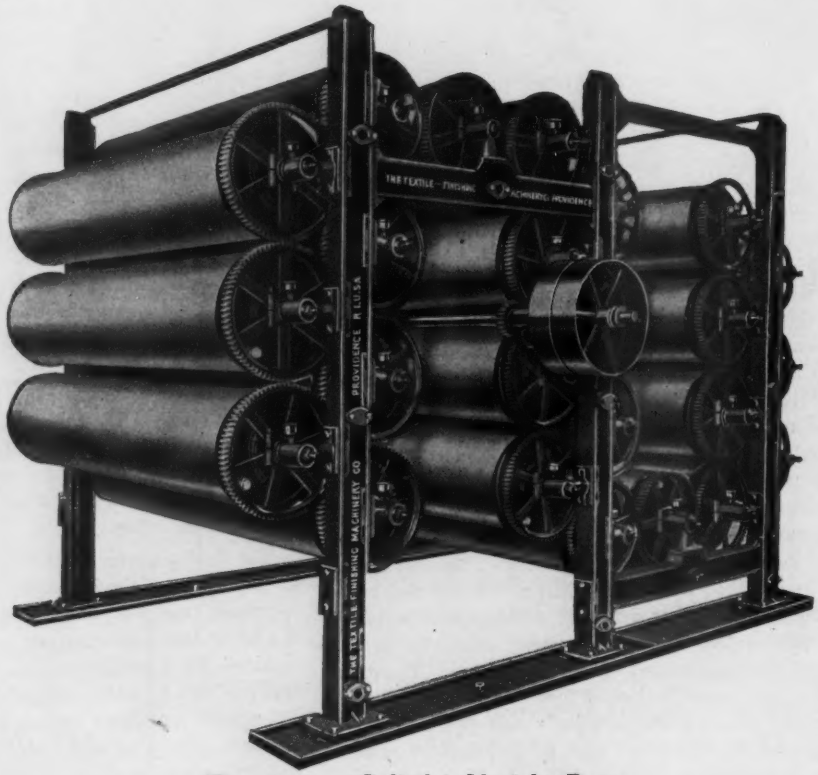

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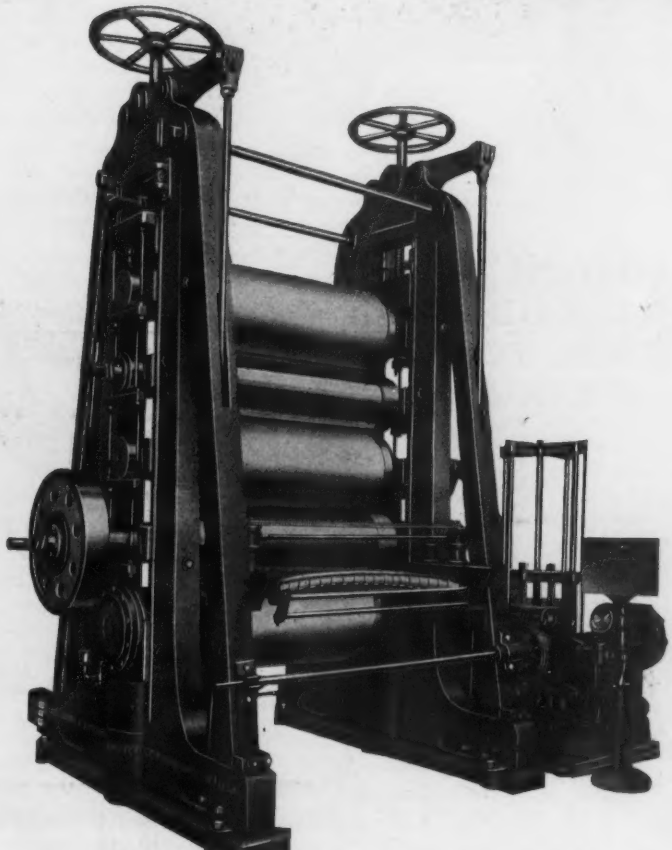

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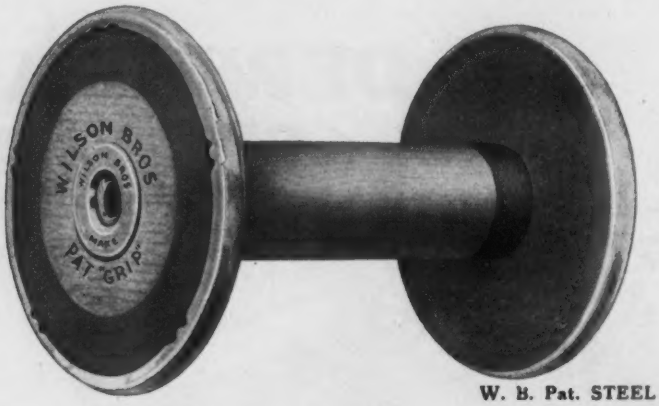

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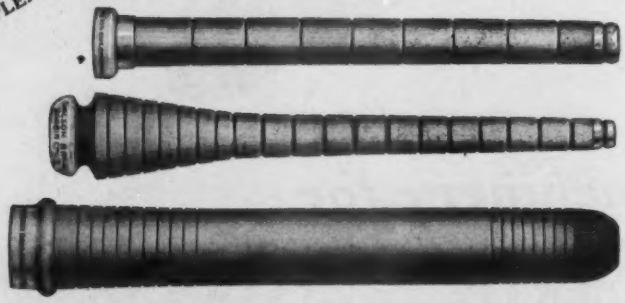

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(*Continued from page* 1245.)

we may be able to get more out of it. I do not know all there is to know about spinning, but as "Old-Timer" says, we should all strive to learn. I believe we can learn by reading questions, but more by trying to answer them.

Now let the readers come on and tear these answers apart, and let us get the best.

CARDER (MASS.)

Slide Rule for Mill Figuring.

EDITOR COTTON:

I have read with some interest R. A. Soniaman's article on "Economy Constants" in March COTTON. While cotton mill calculations are very simple, it is true that for many mill men they are very painful. Anything such as Mr. Soniaman suggests to lessen the amount of head scratching and pencil pushing should be very welcome. However, if the mill man really wants help in this particular I suggest that he invest three or four dollars in a ten-inch slide rule that he can "tote" around in his pocket. He can then solve Mr. Soniaman's problems or any similar ones with a single setting of the rule and needs put pencil to paper only to set down the results. He will thus not only save nine-tenths of the time required by the ordinary method, but will avoid the enormous oxidation of gray matter and imminent danger of apoplexy which often attends this sort of effort on the part of an overseer.

CONTRIBUTOR No. 725.

Roll Covering and Fly Frame Winding.

EDITOR COTTON:

Perhaps the contributor to COTTON who has interested me most, and made me put on my thinking cap, is "Wash (R.I.)", though I have never before entered the great rank of "pros" and "cons". This contributor's two articles, one in the March issue and the other in the May issue and one from "D.E." also of the Midget state, who answers "Wash" in the April issue, cause me to enter into the discussion on speeders.

I have had the pleasure of trying cork rolls; in fact, I have had an opportunity to try all the new things as they come out, but as yet, I have never seen anything to beat leather in the long run. Of course, neither I, nor any other man, can tell "Wash" whether he gets the right service or not from his rolls. He is the only judge. In his article he sets forth two proofs as to why cork is better than leather.

1. Number of rolls sent out.

Of course not knowing how many intermediate frames he has I cannot readily tell how his rolls wear, but in any mill of an ordinary size, it is hard to conceive of having to send out forty rolls a week, unless for a long time they had been allowed to get in pretty poor shape. Since equipping with cork two years ago, namely May 20, 1925, he averages eight per week. Two years is not such a long time and as the frames were probably on leather rolls from the beginning until changing onto cork, I cannot see this as a fair proof, as he is running the cork at its best stage.

I should like to ask this contributor the following questions:

Assuming that the leather rolls were always kept in good condition, what was the matter with them? Did the leather crack, the cots come loose, or what? What was the average life of a roller?

When I get hold of a poor lot of rolls that do not last long the roller coverer is sure to see the date on the back side of the leather. They used poor flannel once and it soon powdered up under use, and remember, they don't feed green apples to the same horse twice. The colic usually makes him wise the first time, the soap factory the second.

Returning to the question, I have occasionally cut rolls in apparently first-class condition and found them to be eight and ten years old. It is my opinion that a poor roll lasts less than a month, and in most cases it is a faulty one, while a good roll lasts indefinitely. Knowing as I do the life of leather, I shall hesitate to equip with cork rolls, knowing that their life is uncertain at the best.

In the April issue "D.E." gives us a few thoughts on the position of the cone belt. I have never been able to run a cone belt at the start of the set at the distance advised by "D.E." or the Saco-Lowell Shops. On an 11x5½ slubber I start the belt at the very start of the cone and get good results. If I start at 7/8-inch as advised, the first layer runs very slack and the bobbin gets hard about half through and soft at the doff. On the 9 x 4½ inch intermediate I start the belt 1¼ inch from the end, 2 inches on the 7 x 3½ inch roving frame, and 3/4 inch on 6 x 2½ inch jack frame. These figures vary considerably from those advised by the machinery builders, but we have found them to suit our conditions. The only time we ever had any difficulty was when we needed a few bobbins of 5.00 hank for some special work. We had to run this on a 6 x 2½ inch jack frame, and the largest tension gear we had was a 55, which was for 8.00 hank, and of course this did not let out fast enough, so we changed the "compound pinion" to speed the bobbins up. We got by for a few bobbins, but I am convinced that if the bobbin is started with a good tension on the first layer and there is a gear to let out the right amount, that the work will run fine. I suggest leaving the compound pinion alone and putting the right gear on, and these advocates of C.P. will sleep easier.

I also notice what "D.E." states about taking a turn off the presser. This is poor dope as I found out in double quick time. One bobbin will get by, but it never runs in the intermediate. It gets cut off. Here is how I found out.

We run a good many staples and hanks of cotton, both carded and combed work. We do not always have enough of any one kind to put a whole slubber on it. At this time I was running some 1 3/16-inch carded work and some 1 3/16-inch combed work, both .60-hank from 60-grain sliver, so I said put them both on the same slubber. Of course when combed work is twisted and wrapped on the bobbin it lies closer than carded work, and after the slubber had run a few layers the combed work was smaller in diameter than the carded. So the slubber tender took it into his head to unwrap a turn from the presser on the combed work. Just the same principle as a layer missing as in end breakage. But what roving that was, it was breaking back in the creel continually. We went a tooth heavier on the carded work on the drawing frame, and this overcame the trouble. But my slubber tenders never put less than three wraps on the presser now. I have it drilled into them that a bare spindle pleases me better than a

full bobbin that must be cut off. I hope no one tries to run less than three wraps unless he has a lighter presser made, because it needs the third wrap to overcome the centrifugal force.

In the May issue "Wash" gives some more regarding compound pinions. In the first place there is no need (as I understand a fly frame) of changing. In the second place, it is not the gear which is to be changed if it is desired to increase or decrease the speed of the bobbin, inasmuch as the speed of the rail remains the same, thus causing either too close or too wide a lay of the roving. Suppose we change the gear on the end of the bottom cone. We either wrap faster or slower, but the lays per inch remain the same. But how the speed of the rail affects the taper of the bobbin I fail to see. No matter what speed the rail may have, it always changes when it is up or down, and every time the flop over turns, the builder screws up the same amount for every change. How the taper is changed is beyond me.

CONTRIBUTOR NO. 738.

Anent Card Grinding.

EDITOR COTTON:

The article under the heading, "Anent Card Grinding," which appeared in the October issue of COTTON, signed by "M. L. B. (S. C.)", is a subject which ought to be dealt with seriously by cotton mill executives.

It is quite true, as "M. L. B." states, that the majority of card grinders are under-paid, and are, in many cases, not treated or used in the way their position demands. Of course, regarding the financial side of the position, that depends upon the conditions governing the especial job. Still, the writer knows of grinders who are expected to act as general helpers, for instance, for the second hand, and also help electricians, having to clean motors twice a week and do other little things which take them off their section. Now it is all very well to have a man around who can grind cards, at least change the wheels and do other odd jobs besides. That kind of business works fairly well for a certain time, but no matter how small the section may be, it is surely bound to suffer if the proper section hand is not always around.

It is not sufficient for a man to be able to change the grinding rolls, and set them—and, by the way, some so-called grinders cannot do that properly—but a good man will be on the job always and also be quick to detect any deficiency in the running of the cards or the work being produced, and furthermore, be just as quick to remedy the trouble.

Our friend "M. L. B." says:—"Why not pay the grinder as much as other section men?" and if he means a first-class man, I agree with him that good grinders deserve more pay, but if he means any grinder who comes along, I will say: let's train them first.

There is a funny thing about the card grinding job, and so many fellows like "M. L. B.'s" friend, the "super", seem to think that it is easy to learn to grind cards. As an old timer, and a one time grinder, I will say that such people do not understand carding or the function of a carding engine. They seem to think that all the grinder has to do is just oil the cards, grind two or three a day, or perhaps one, and he has about covered his job. They will tell you that cards don't give much trouble regarding breakages, and so there is very little fixing to do.

Such are a few of the comments which the writer hears from time to time in the mill, but they do not receive any attention from him, as he knows that all his grinders are fully equipped to cope with any necessary fixing which has to be done on their respective sections.

A very important point I wish to mention, and which is similar to what "M. L. B." says regarding a "green" card grinder causing considerable expense to a company, and regardless of the matter of damaging clothing, I must say that poor grinders, as I have known them, cause much expense in several ways, not knowing that they are guilty. Take for instance, in card rooms where all the ropes have to be spliced. There is a great deal of waste rope created owing to some grinder who does not happen to know how to splice a rope so that it will last and wear for a considerable time. What happens is that they get the idea of piecing a rope somehow and if it looks right, regardless of the proper thickness, etc. they use it, with the result, as the writer surely knows, that so many hundreds of yards of rope are wasted through piecing or roving before the rope has given a full length of service. The writer has met dozens of grinders, and others, who do not know how to splice a rope properly.

Then again we find grinders and other fixers who really do not know how to "fix" a belt with the common belt hook in use, simply because they have not been shown, or have never been checked in the mistake. The writer knows old grinders who fail miserably in this job of "fixing" a belt, and it is common to see that these fellows never take the trouble to do that job perfectly, but they go to work and hammer away at the belt and hook and eventually make a series of rivets on the latter, though at the same time they ruin the end of the belt and the hook in the bargain. Just ignorance, that's all; whereas, if these fellows knew the little things properly a great amount of time could be saved and waste be avoided.

In the foregoing, I have only mentioned the little things that count in the job of grinding. Now in his letter, "M. L. B." mentions that the grinder must have judgment. I will say that he needs excellent judgment if he is going to be of any use to the company who hired him, as in the course of his day's work there is likely to be a call on his quickness of thought at any time.

For instance, the writer knows a case where a "green" grinder happened to hear a rumbling noise on his grinding card and after having a look around and getting excited he found one flat rubbing, a high flat of course, so not being very familiar with the flat setting points, and not caring to show his ignorance to the boss grinder he took a chance to ease the flats off the cylinder, but being kind of excited in the bargain, he turned them down—Crack!—and you carders know the rest. Several flats were broken before the card could be stopped. Lack of judgment, coupled with ignorance, caused that fellow to lose his job, and there are many others like him who are put in charge of a set of cards because they can set the rolls and do one or two other jobs around.

How many so-called card grinders know how to clothe a card or even know what you mean when you talk about counts of wire fillet, or who know even the numbers of the wire they are grinding? Not very many I think.

The reason for this is of course because most grinders now-a-days kind of "pick it up" off the other fellow if

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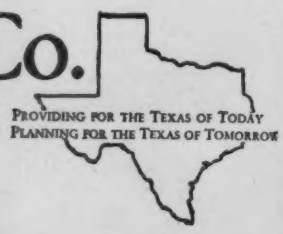

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the latter cares to show him anything, and so we have an army of probably very good workers, but very few real grinders who know their job perfectly.

It has been the writer's desire for a long time now, to see some kind of an apprenticeship scheme introduced whereby young fellows who desire to become carders could be taken on by any company desiring them and be trained by one good grinder, at the same time assisting in other work on cards and so gaining experience which he would need in two or three years hence.

In England this system is now adopted, and a young fellow has to serve two years as an apprentice in the carding department before he is allowed to take a card-stripper's job. This system, to my mind, weeds out a good many unfit grinders. Still, as a parting word to overseers, second-hands and boss grinders, I would say: Coach your grinders, and let them think that they have an important position in the mill, which they have, and above all, help them along if they need help.

D. E. (R. I.)

Spinning Defects.

EDITOR COTTON:

I am sure that all the readers of COTTON enjoyed the article "Cockled Yarn and Other Spinning Defects" appearing in the May issue and constituting your report of the Spinning Division Discussion Meeting of the Southern Textile Association held at Union, S. C., on May 23rd.

As usual, I differ with most of the arguments advanced during the meeting. In my opinion J. H. Huff, Superintendent, Camperdown Mills, Greenville, S. C., got to the real cause of the cockled yarn when he said:

"I think the most important point is the stock in the card room, or the unevenness in the carding."

In other words, what he really conveyed was, that the stock and the way it is handled is the most important point, and he is dead right.

The goal in all cotton mills is yarn uniform and strong. There are about 140,000,000 fibers in a pound of ordinary cotton. The average mills use about 50,000 pounds weekly. The many doublings of laps cause the fibers to be drawn past one another during attenuation many times, which aids in constructing a strand or thread with nearly the same amount of fibers in its cross section.

Therefore, if the sheet of lap varies in weight, and say, if the two extremes come together (heavy and light) then an even strand in the succeeding processes is hopeless. So we must start at the very beginning and not get careless, as most of us are at times. How many carders give their strict attention to the automatic feed boxes. We all know that they should be run evenly, that is, not too low or too full. I, for one, am willing to confess that I have neglected this important point. Still, you know this evil causes a great difference in the weight of the breaker sheet of lap which is only partially remedied by the intermediate and finisher pickers.

Sometimes the evil mentioned comes under the action of an evener that lacks sensitiveness, which makes matters worse.

When the lap is presented to the action of the card it has been, or should have been, cleaned and opened into an even sheet, although it has not been thoroughly freed from all impurities. Granted that we have as even a sheet of lap as possible, do we spoil it in the end? We certainly do at times. Examine the web on all cards, and the same trouble will be found here as with the tension on fly frames, owing to the position of the doffer comb, or the wrong draft between the doffer and calender rolls. A little stretch here means a different number of fibers in the cross section of the carded sliver.

Let us assume that we have an almost perfect carded sliver from the card; do we spoil it on the drawing frame? Let us see. The trumpet, you know, is like the draft rod in the long draft system of spinning, that is, the heavier the sliver the greater the friction in the trumpet, and the greater the friction in the trumpet, the slacker the web as it should be. Therefore, in order not to spoil the good work from the card, we must arrange the draft on the drawing and also the settings of the drawing rolls so as to suit the size of the trumpet to create a slack web at all times. Are the foregoing conditions found on all drawing frames? I think not. However, do not forget that with a stretch at this point and at this stage of manufacture, the evil is greater.

What causes light yarn? We cannot lay the cause of light yarn to the drawing rolls, as we are forced to admit that the front rolls must receive what stock the back rolls convey to them, and although the roving or yarn may be faulty in spots, the work can be made heavier by the retardation of the front top leather roll, but never lighter. In other words, you may have the production of a roving or yarn full of thick and thin places, but the weight of the yarn can never be lighter than the draft indicates, though of course it can be weaker.

This subject is a serious one and should be discussed at such meetings. Let us suppose that the chairman put the following question: "A mill is hung-up to produce 28s yarn. What causes the yarn to vary two numbers when the finished drawing does not vary more than two grains to the yard?"

I have already pointed out, that any stretch in the web, preceding the slubber, will vary the amount of fibers in the cross-section of the strand. Strictly speaking, the strand as delivered from the drawing rolls on all fly frames is a web. Therefore, if the drawing rolls are not responsible for the light yarn, then we must look for the trouble from the bite of the drawing rolls to the surface of the bobbin.

As a rule, very few mill men consider the importance of well constructed and properly balanced flyers, but it should be remembered that the flyer found in fly frames is a more ingenious contrivance than most mill men regard it. Any person who has devoted much time to studying the objects of the presser rod attached to the hollow leg of the flyer will admit this.

Flyers found on up-to-date fly frames are constructed on just one principle, which is to attach the presser rod to the hollow leg of the flyer as snugly as possible and, at the same time, give the presser rod due freedom to fly outward and respond to the speed of the spindle or flyer. This principle must be maintained at all times on all flyers in order to have well balanced flyers and obtain bobbins of the same diameter and compactness. There are a great many practical men who, to this day, will judge the compactness of a bobbin of roving by the number of turns to the inch inserted in the strand. Although the writer is willing to admit that in most cases soft bobbins result from

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lack of twist, at the same time while it is admitted that a great many soft bobbins result from lack of twist, the real trouble in such cases is often found to be poorly or imperfectly balanced flyers.

Some of our most progressive carders have been led astray by shaky bolsters, bolster rails and spindles. Did the reader ever notice how a certain number of either bolsters or spindles would cause a portion of the carriage to shake? One would really think, in such a case, the slide arm connecting the slide to the carriage rail was loose although, at the same time, it is perfectly tight. The trouble is in the flyers; they need to be balanced, and no matter how their position is changed there will be the same vibration.

That the flyer and its purpose is little studied by those in charge of fly frames, even by carders, is proven by the fact that you will find many mills, and fine goods mills too, where the speeder tenders are instructed to turn their flyers so that the presser rods on the back row of flyers will be on the opposite side of the carriage from those on the first row; or, in other words, to so adjust all the flyers that the presser rods will meet at every revolution of the flyers at a point between the two rows, and some will even argue in favor of this method, claiming that the carriage is thereby better balanced. They do not stop to think, however, that every flyer on all speeders has been balanced separately, and they may just as well argue that it is necessary to place all pulleys on a line shaft in one position, so that the shaft will be better balanced. We admit that it is not true about pulleys, and is it not the same with flyers? Does an unbalanced flyer affect the spindle which supports it in the same way that a pulley out of true will affect a certain portion of a shaft?

Upon examination of the flyers it will be found that the side of the flyer, or leg, to which the presser rod is attached, is hollow, while the other leg is solid. One leg is made hollow to allow the strand to pass through it, which is, of course, one reason for that formation of the leg. But it should be remembered that such a large channel is not necessary, and the hollow and solid leg had to be adopted in order to enable a rod to be attached to one side of the flyer and, at the same time, not overbalance the other side.

The foregoing is a point that should be weighed by those who have and are now instructing speeder tenders, because, when flyers are so arranged, the time for piecing a number of ends is about double. Furthermore, owing to the presser finger pointing in the opposite direction to the opposite row, it is necessary for the tender to change the position of the flyers, after piecing the broken ends in one row. The writer knows of a mill that has few good speeder tenders for the reason that they oblige their tenders to arrange their flyers as just stated. When flyers are so arranged the production of the frame is lessened, which affects the tenders' wages as well, and although some may say that the difference is very slight, why should flyers be so arranged when it works against both the mill and the help?

Others will argue that with the flyers arranged in this way, a better balanced carriage is obtained, for the reason that the pull from the bottom of the hollow leg, or the point where the strand passes from the flyer to the presser finger is great, and when the flyers are worn they may be turned opposite to each other, thereby aiding in balancing the spindles, flyers and carriage.

Here let us study the only point that should receive any consideration on this subject. Obviously it takes very little cotton inside the hollow leg to break the strand at the end of the presser finger that guides every coil of roving on the bobbin, which proves that the pull on the flyer at this point is not so great as some would have us believe. The pull is between the eye in the presser finger and the surface of the bobbin when the tension on the frame is as it should be. It should, therefore, be apparent to the reader that both legs of all flyers must be equally weighted in order to obtain the speed found on up-to-date fly frames and avoid vibration, as it is common to find flyers running 1300 revolutions per minuate on fine speeders.

The foregoing should be enough to convince any person that changing the position of the flyer does not stop vibration, because each flyer must be considered separately. With this in mind, let us consider the presser rod not properly adjusted to the hollow leg of the flyer, and unable to respond instantly to the speed of the flyer. In such a case there is not the required pressure at the termination of the presser finger, and on all such flyers, the diameter increases faster, and the relationship of the surface speed of bobbin and front rolls is destroyed and stretch takes place. There lies a cause of light yarn.

To those who are skeptical regarding this matter, let them examine the flyers at doffing time and see how many presser rods have not the freedom they should have. In all my experience, I have found this to be the most important point to watch in the production of uniform, strong yarn.

WASH (R. I.)

The Roller Winding Motion on Mules.

EDITOR COTTON:

In the April number of COTTON is a question from "Contributor No. 548" on mule spinning. He wants to know if there is any gain in production by using the 3-inch roller motion during winding providing the spindle speed and twist per inch are exactly the same. I am only too glad and willing to tell this contributor all I know concerning this particular motion by answering his question in every detail, as far as it lies in my power and ability.

However, it will perhaps be an advantage to point out that the object of this motion is to increase production by delivering cotton from the rolls as the mule carriage "takes up" or moves in to the roller beam. It is a supplementary motion and its function being to deliver in the aforesaid manner a small amount of yarn, say from 2½ inches to 3½ inches during every run-in or "take-up" of the carriage. It has been known in some cases, where Sea-Island cotton has been worked, to have 4 to 5 inches thus delivered.

Of course this is an excessive amount and no doubt proved very detrimental to the spinning. It will readily be seen that the winding roller motion is chiefly used on mules which are spinning long stapled cottons. In the spinning of short American stock opinions differ regarding the use of this motion, and a good many mules are not equipped with it. However, let it be understood that, during the whole operation of winding, a certain amount of twist leaves the already twisted yarn, and runs into the yarn that is being slowly delivered from the rolls, that is when the winding roller delivery motion is in use, and this amount of twist is enough to prevent yarn breakage while

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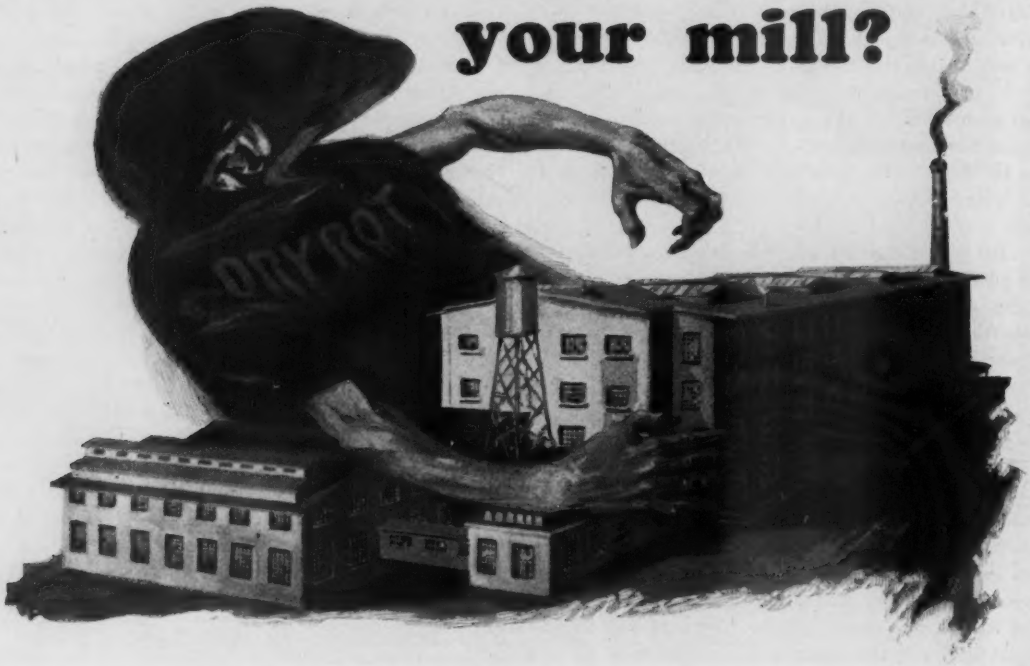

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winding-on is being accomplished. It is also perhaps worth noting that the yarn which is delivered during each "run-in" as stated, is not wound on the spindle during that same "run-in", but it remains extended between the nips of the rolls and the spindle point, until the carriage has completed its "run-in" and the fallers change, and of course this small portion of yarn is subject to the whole of the twisting accomplished during the next "run-out."

However, after surveying the foregoing it will undoubtedly be understood that this winding motion is a great advantage in the spinning of long stapled cottons but rather doubtful when spinning lower grades.

Referring to the question as to whether there is any gain in production by using a 3-inch motion under the conditions as stated, I must say I am rather doubtful regarding it in some cases. Anyhow, just to illustrate, let us take for instance a modern mule spinning 30s yarn from a medium grade of American cotton, and this mule has a spindle speed of about 10,000 to 11,000 revolutions per minute, and this is the limited speed. On this mule there is not any roller motion.

However, if we apply the latter we must also increase in proportion the turns per inch put into the yarn during the outward run of the carriage. Now if we accomplish this by the usual method of changing the carriage speed by means of the speed gear, then we should find that the gain in production during winding-on would have been lost during spinning, and it is possible that, with the grade of cotton in process, there would also be a greater percentage of broken threads during spinning. Of course there is another method, namely, to increase the spindle speed by applying a larger rim pulley, but this would undoubtedly incur more risk of bad spinning, not to mention unsteady spindles. Different conditions occur, however, when the required twist per inch and the grade of cotton will permit of a suitable spindle speed to allow for the roller delivery motion.

If we take a case of a mule spinning say from 70s to 90s filling yarn from a good grade of Egyptian, the turns per inch required is very moderate, and therefore, the maximum speed of the carriage can be attained and still enough twist inserted in the yarn to allow for the function of the roller motion, with say a spindle speed of about 9,500 revolutions per minute. So in a case of this kind the 3-inch winding roller motion would prove satisfactory in gaining production during winding-on. For these numbers or counts a twist multiplier of 2.5 will be sufficient.

Here I may mention, and no doubt "Contributor No. 548" knows, that the best practice has been found in several makes of mules to impart this slight winding roller motion from the back shaft to the front roll. Many years ago quadrant side shafts were in use very much and these were very convenient for driving the motion. Now-a-days, as far as the writer's knowledge extends, most makes of mules have three gears from the back shaft to the front roll, and the motion is driven by these gears. The small gear on the back-shaft drives through a carrier a larger gear on the front roll spindle. This arrangement of drive is the same on most all makes of mules, though the sizes may vary.

However, the driving is somewhat confusing since the motion is out of gear during the "run out" or spinning, and also during receding, when the latter is needed. Therefore, a spring and ratchet gear arrangement is used similar to the one on the winding-on motion, and this as a rule is centered on the back shaft; others on the front roll spindles.

On one make of mule, with which the writer is familiar, the small gear on the back shaft ranges from 13 to 17 teeth just as is needed to produce more or less gain of yarn and also to suit different diameters of front rolls. The carrier gear contains 40 teeth and the gear on the front roll 41 teeth. Therefore, it can readily be seen that a larger gear on the back shaft or a larger diameter of front roll would cause more yarn to be delivered during every inward run of the carriage, providing other things were equal. If the same delivery of yarn were required with a larger diameter of front roll, we should have to put on a smaller gear on the back shaft.

Taking an example, let us assume a front roll diameter of say 1-inch and the front roll gear to contain 41 teeth, and we desire a gain of 3 inches at every inward run. The circumference of the back shaft scroll is six inches, that is, to the center of the bands, revolutions of back shaft per outward run are 3.25, that is, one way, and of course the same amount during the inward run.

Now we want to know the number of teeth the back shaft gear should contain in order to obtain a delivery of 3 inches during each inward run or during winding-on. The revolutions of the front roll in this case must be as follows:

$$\frac{3}{3.1416} = \text{revolutions of the front roll}$$

To obtain the required gear we divide the front roll speed and the front roll gear by the back shaft revolutions, hence, we get:

$$\frac{3}{3.1416} \times \frac{41}{3.25} = 12\text{s gear}$$

Again, in ascertaining the number of inches delivered during each inward run we could proceed as follows: say, a gear on the back shaft is a 14s, the front roll gear 40s, back shaft revolutions per outward run is 3.25. The front roll is 1 1/16-inch diameter, and we have:

$$\frac{3.25 \times 14}{40} = 1.13 \text{ revolutions of front roll, then:}$$

$$1.13 \times 1\ 1/16\text{-inch} \times \frac{22}{7} = 3.77 \text{ inches delivered.}$$

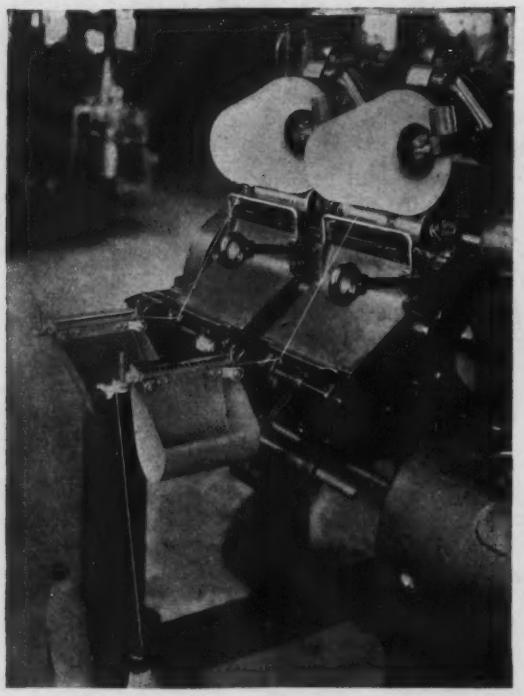
It would be advisable, in order to obtain a good idea of the amount being delivered during the "run-in", to chalk or mark in some way the last roll, and take particular notice how much this turns.

Another calculation by which we could ascertain the size of change gear when we desire to deliver a specified amount of yarn during the inward run is worked as follows:

When the winding roller motion is driven from the side-shaft as previously stated, say, a 15-tooth gear on the side-shaft drives a 35 on the stud, and on this is a change gear of 20 teeth driving a front gear of 40 teeth, revolutions of side shaft during the inward run 3½; diameter of the front roll 1 1/8-inches; gain of yarn delivered during the inward run required to be 3½-inches.

First, ascertain the revolutions of the front roll as follows.

$3.5 \div (9/8 \times 22/7) = 98/99 =$ revolutions of the front roll.



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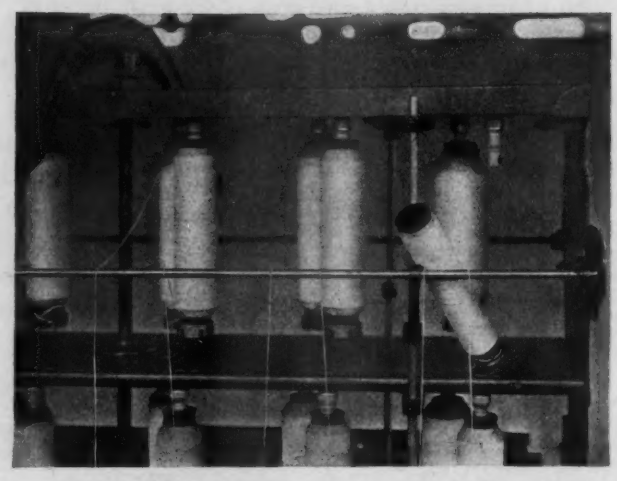

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Then: $\frac{98 \times 40 \times 35}{99 \times 15 \times 3.5} = 26.4$

which would mean that a 26 gear would be required.

That, however, concludes my remarks on this question, and I am hoping that "Contributor No. 548" finds some little information therein, and if he has any other questions of a similar nature let him send them along, as he will undoubtedly find someone, as well as myself, ready to help him as much as possible in the "How Other Men Manage" section of our journal.

D. E. (R. I.)

EDITOR COTTON:

In the April issue the following question on mule spinning was asked, "Is there any gain in production by the 3-inch roller motion while winding, provided the spindle speed and twist per inch remain exactly the same?"

In order to get the same turns per inch with the roll delivery motion that is obtained without it, it would be necessary to add the number of turns for the extra three inches of yarn delivered. One of the counts I am spinning at the present time is 58s, so I will use this count for my explanation. We have 57-inch stretch mules and a 3-inch roll delivery motion, which gives us a delivery of 60 inches per stretch. I am putting in say 2.85 times the square root of the number for turns per inch of twist. The square root of 58s is 7.61, so that $2.85 \times 7.61 = 21.69$ turns per inch. I figure out the turns in the usual way, then multiply the turns as figured by 60 inches and divide the result by 57 inches. This gives the extra turns required for the extra three inches of yarn delivered.

$\frac{21.69 \times 60}{57} = 22.83$ turns.

Thus, 22.83 turns per inch would be required during the outward run of the carriage to give 21.69 turns per inch in the yarn being spun with the 3-inch roll delivery. In order to put in the extra turns required for the extra three inches, it would be necessary to reduce the speed of the mule so that part of the increased production is lost.

Actual stretches or draws per minute without the roll delivery were 4.363 or four complete draws in 55 seconds. Actual draws per minute with the roll delivery were 4.267 or four complete draws in 56¼ seconds. The spindle speed was the same in both cases. In fact the spindle speed is not considered or changed in connection with the roll delivery motion.

The foregoing figures were taken on the same mule, one set of figures after the other.

The problem now is to find 100 per cent production of both timings for a week of say 48 hours. Without the roll motion it would be as follows:

$\frac{57 \times 60 \times 48 \times 880}{36 \times 840} = 4777$ constant for 57-inch stretch.

To get the pounds per mule with the constant, multiply the constant by the draws per minute and divide by the counts as follows:

$\frac{4.363 \times 4777}{58s} = 359.34$ pounds per week.

The figures in the constant are: 57 inches length of

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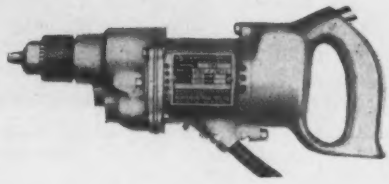

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stretch or draw; 60 minutes per hour; 48 hours per week; 880 spindles per mule; 36 inches per yard; 840 yards per hank.

With the roll motion the figures would be as follows:

$$\frac{60 \times 60 \times 48 \times 880}{36 \times 840} = 5028.57 \text{ constant for 60-inch stretch.}$$

The weekly production would be figured in the same way:

$$\frac{4.267 \times 5028.57}{58s} = 369.94 \text{ pounds per week .}$$

The gain, or increase in production with the roll motion on, with the same turns per inch of twist and the same spindle speed, would be .0295 or practically 3 per cent.

If the extra turns of twist are not put in to allow for the three inches delivered by the roll motion, the gain would be still more as the following figures will show. I will use the constant 5028.57 and 4.463 draws per minute and the same counts:

$$\frac{4.363 \times 5028.57}{58} = 378.26 \text{ pounds per week 57-inch stretch.}$$

The gain in production would be .0526 or practically 5 per cent more by putting on the roll delivery motion and not putting in any more twist. The turns per inch wou'd in this case be:

$$\frac{21.69 \times 57}{60} = 20.60 \text{ turns per inch.}$$

If I was putting the roll delivery on mules I would first experiment without putting in any extra twist. The extra twist would cause a slight amount more of drag.

CONTRIBUTOR No. 675.

EDITOR COTTON:

In answer to the question on mule spinning in the April issue, I will say, yes, there is an increase in production with the roll delivery motion while winding than without it, but the gain is so small that my experience compels me to condemn it except in rare circumstances. The general opinion is that there is approximately 5 per cent gain in production and I have in mind one mill which, when they use the roller motion, do so to increase production from a 56-inch stretch to a 59-inch stretch. They increased all right but they offset this increase by having to put on a smaller driving gear to preserve the turns per inch.

I claim the increase is nearer a half of one per cent than it is five per cent, and the reason of the small increase is because the mule changes once every 59 inches delivered, against once for every 56 inches delivered. Some years ago I worked this out and there was a saving of about three-quarters of an hour in a 54-hour week. I used to have the opinion that there was five per cent increase because I was taught so, and I will briefly illustrate why I changed this opinion.

I was spinning 70s with 2.90 times the square root as a twist multiplier, putting in 24.26 turns per inch with head twist. The spinning was not very good and I decided to take off the head twist and put the 24.26 turns in during the drawing out of the carriage. I followed the accepted rules to get the correct gear and put the head twist gear out of commission. What happened? My production went up between 5 and 6 per cent for no reason that I could see as I thought I was putting in the same twist.

Investigation showed me, however, that the three inches of roller motion delivery, which had not been considered, was taking its share of turns of twist. Now I have never seen a rule in any text book that considers the roll delivery while winding except where head twist is used.

I can readily see why. The roller motion delivery was only intended to be used on fine yarns and fine yarns should always use head twist. However, in this country roller motion delivery has been generally applied. This principle is wrong, I think, where coarse yarns and short staple cotton is used.

The turns per inch I was putting in was 22.9 or 2.75 times the square root. This set me to thinking and I conceived that if I lost twist by this procedure, then if I should take out the roll delivery without any other change, I would be putting in more turns per inch, regardless of whether I was using head twist or not. That of course is just common sense, and to get the correct turns again I must speed up my carriage to the correct speed over the roll delivery. I think this proves that there is no material gain, and, as I said before, the very fact that fewer stoppages are are made where a longer strength is used and the three inches delivered by the rolls while winding is equal to a three-inch longer stretch is the only saving made.

The only rule I follow now is one of simple proportion, thus:

I take the figured gear, which we will assume to be 30 rim pinion, multiply it by the length of stretch, plus the inches delivered while winding, and divide by the length of stretch.

$$\frac{30 \text{ (gear)} \times 63 \text{ (60 stretch plus 3 inches)}}{60 \text{ (stretch)}} = 31.5 \text{ gear.}$$

I trust this will convince the man who asked the question and other readers interested. I am convinced until I am shown differently.

CHRISTY (MASS.)

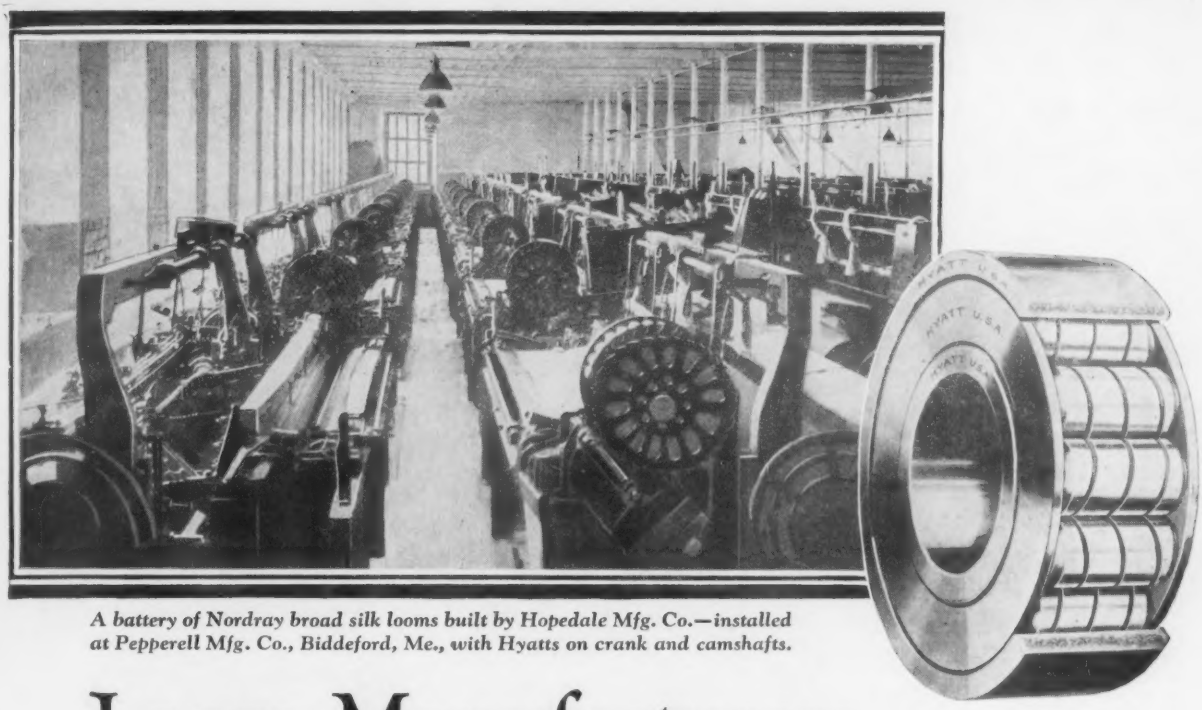
EDITOR COTTON:

In answer to "Contributor No. 548", in the April number of COTTON concerning information on mule spinning in reference to the roller motion while winding, would say, the merit of the motion is, that it adds to the production of the mule. The motion is used in medium numbers, providing a good quality of cotton is used for the counts spun, but its use is almost universal for fine spinning mules.

This contributor asks if there is any gain in production, provided the spindle speed, and twist per inch remain exactly the same. I do not see that the spindle speed or twist per inch need to be taken into consideration, with the question involved, other than having these very nearly right for the quality of cotton being used and the numbers spun.

If "Contributor No. 548" were spinning on a mule with the length of stretch 60 inches, and has a 3-inch roller winding motion added, he certainly must figure his turns per inch for 63 inches, which simply keeps his turns per inch just the same as before using the roller motion. It is not advisable to apply this motion where a poor quality of cotton is used in proportion to the counts spun.

The extra 3 inches length of yarn during winding receives some of its twist from the next part of the yarn



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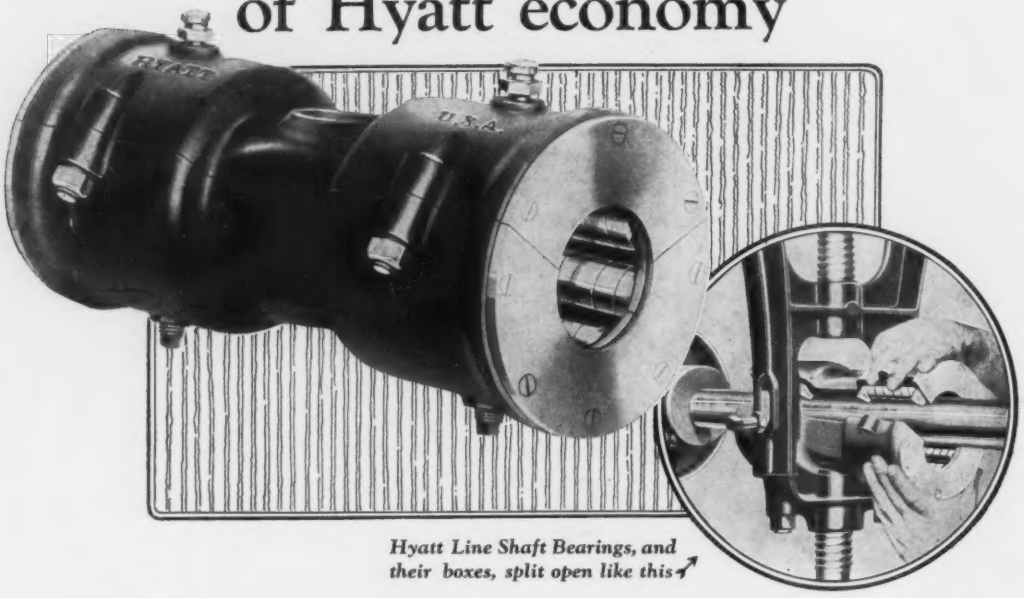

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during the in-going run of the carriage, and some twist during the next outgoing of the carriage.

I trust that this simple explanation will be of some help to this contributor.

C. B. (CONN.)

EDITOR COTTON:

In answer to an inquiry on page 567 of the April number of COTTON, under the heading "A Question on Mule Spinning", "A definite and complete answer" is requested, and I am herewith giving my views from both practical experience and a study of the subject.

First, I will state the different lengths of outward stretches commonly used. For fine yarns, a 53- to 57-inch stretch is used, and as low as 48 inches has been used for very fine yarns. For yarns from 80s to 100s, 59 to 60 inches is used. For numbers from 30s to 60s, the most common length of stretch is 64 inches. For waste yarns or low numbers, a longer stretch may be used. The length of stretch used must be governed by the yarn being spun, as too long a stretch will cause bad spinning, the ends being likely to break excessively at the last two inches of the stretch.

The winding motion has been more generally used in fine numbers than on coarse numbers. The adding to the mule of the 3-inch roller motion while winding, is for the extra production obtained. A 60-inch stretch with a 3-inch roller delivery motion, is equal to a 63-inch stretch, and if "Contributor No. 548" is to apply this motion to his mules and is to use hank clocks—and in figuring production and twist constants the total stretch of outward run and the amount of delivery while winding must be considered—Thornley gives the following calculations to assist anyone who contemplates applying the roller delivery motion while winding:

Suppose we have back-shaft scrolls, each 5¼-inches in diameter, and the stretch is 64 inches. How many revolution will the back shaft make during the return journey?

$$\frac{64}{3.1416 \times 5.5} = 3.70 \text{ revolutions.}$$

Assume now that we desire to deliver 2½-inches of yarn per stretch. The diameter of the front roller is one-inch, and we desire to find its circumferential traverse to deliver 2½-inches during the inward run.

3.1416 : 2.5 :: 1 : X

2.5 ÷ 3.1416 = .795 equal parts of a revolution to be made by the front roller during any one run-in of the carriage.

Assume also any size we like for the wheel on the back shaft; we can then easily find the size of the wheel required to put on the front roller. Take it at 25. We then have:

Revolutions of the back shaft per run-in 3.70

Revolutions of the front roller .795

Wheel on back shaft 25 teeth. Find the teeth required in the front roller wheel.

$$\frac{3.70 \times 25}{.795} = 116.3$$

Suppose, on the other hand, we had a 100 wheel to put on the front roller and we desire to find the proper wheel for the back shaft, then:

$$\frac{.795 \times 100}{3.70} = 21.5$$

The 2½-inches of yarn which would be deliverd by the aforementioned motion during any one inward run of the carriage would not be wound on during that run-in, but would form part of the yarn for the next stretch, and would thus receive its full share of twist. Enough should run into it immediately upon its delivery to prevent breakage.

One must not doubt that the roller motion while winding increases production. If running the 3-inch roller motion while winding, the motion becomes out of working condition, the mule can be run without the 3-inch delivery while winding, but the quadrant nut will have to be turned up, thus decreasing the speed of the spindles, there being three inches of yarn less to wind on the cop. If the same twist gear is left on, more turns per inch of twist will be put in the yarn.

If the delivery of yarn is observed it will be found that in addition to increased production, the straining effect on the yarn during winding is relieved. It is a recognized fact that at the starting in of the inward run the long length of the yarn will stand more bending, but as the length gets shorter the strain becomes greater, and is relieved by the delivery of yarn with the 3-inch roller motion, and is, in addition, an advantage in increased production for fine work.

There has always been a difference of opinion among mule spinners concerning the 3 inches receiving its twist during the winding as the twisting has been completed and the winding commences. As before stated, this 3 inches delivered while winding, is not wound on during this run-in of the carriage, but forms a part of the yarn for the next stretch, and that it will thus receive its full share of the twist is more certain in well twisted and fine yarns.

I hope other readers will give their experiences on this subject, which I shall be interested in reading.

R. I. G. (MASS.)

Some Things That Cause Uneven Yarn.

EDITOR COTTON:

In the February issue, I saw someone was writing on uneven yarn. This is my first attempt to discuss the subject, but my idea is to begin in the opening room.

We have in our opening room a Saco-Lowell opener and condenser. We open ten bales of cotton at a time and then take it and sample it to see if it is inch staple. I find there are a lot of mistakes in mixing cotton. That is the trouble of mills in keeping even numbers.

The condenser carries the cotton into the picker room, and it goes into the breaker. We make a 16-ounce breaker lap and a 15-ounce intermediate and a 15-ounce finisher lap. The finisher picker is the most important machine in the mill. I think in order to have even yarn, it must be started in the picker room. We have a Kitson finisher with two carding beaters. The speed of the beaters is 1,250 r.p.m. Feed rolls are set 3/16-inch, that gives a good smooth lap. It is important that the draft on the pickers be kept right. Sometimes we get too much draft on one side and it causes a thick and thin place in the lap and we have to watch that.

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I look at the card as a most important machine. We watch our card hands, and don't let them double the laps. When we strip our cards, we let them run about two minutes and pull that singling out. If we want yarn to be even we must set the cards right. Some card grinders are satisfied just to put the roller on the card and start it up. The rollers have to be set correctly. Grind the card sharp. I always see that the card is sharp before I take the roller off, then I set the card up. I think our breaking strength depends partly on the way we set our cards. We can set the licker-in too close and cut the fiber on the feed plate.

We make a 55-grain sliver on our cards and a 60-grain sliver on drawing. We run 20s yarn and the breaking strength ranges between 88 and 95 pounds. I don't mean to say we make perfect yarn. Our yarn varies some. I would like to see a mill where they do make perfect yarn. Regarding the drawing, in the first place we must keep the drawing clean and keep the laps off of the rollers so as to prevent the drawing from cutting the rolls. I find the closer the rolls are set the evener the work is. We must notice if the stop motions are working. A lot of times the spoons won't knock off when an end runs out and that will cause a singling, resulting in a light streak in the drawing.

These are just some of the things that will cause uneven yarn. A. L. G. (S. C.)

Another Mill Lay-out.

EDITOR COTTON:

In the May issue of COTTON, "Contributor No. 2719" requested a lay-out for a 25,000-spindle mill, 12,500 spindles to be on 50s warp and 12,500 spindles on 70s filling. I noticed a reply from two contributors in the June number, giving the number of each kind of machine required for this lay-out. However, an additional lay-out may be of interest, so I shall give my own experiences based on practice.

This man does not say what part of the country he is in, or how many hours he runs, but I will use a ten-hour day as a basis.

For 50s warp I should use 1¼-inch cotton, and for 70s filling 1 5/16-inch cotton. In the 50s warp yarn, assume we use a spindle speed of 9,750 r.p.m., and 4.25 as a twist standard. This makes 30.1 turns per inch of twist and a front roll speed of 103 r.p.m. With this hook-up, and an allowance of five per cent for doffing and breakage, we should get a production of .128 pounds per spindle per ten hours, times 12,500 spindles, which equals 1,425 pounds.

In running 70s filling, with 7,825 r.p.m. spindle speed, and 3.20 as a twist standard, making 26.75 turns per inch, we have 93 r.p.m. front roll speed, which with a three per cent allowance for stoppage, gives .082 pounds per spindle or 993.25 pounds of filling yarn per ten hours.

Using the foregoing, we will assume we must produce 1,500 pounds of warp and 1,000 pounds of filling. I consider these figures conservative for spinning. If the staple cotton indicated can be used, I believe less twist could be run, thereby increasing the production. In case shorter cotton is used, additional twist may be necessary.

Now that we have determined the amount we must produce, we will start at the bale. There are several ways of

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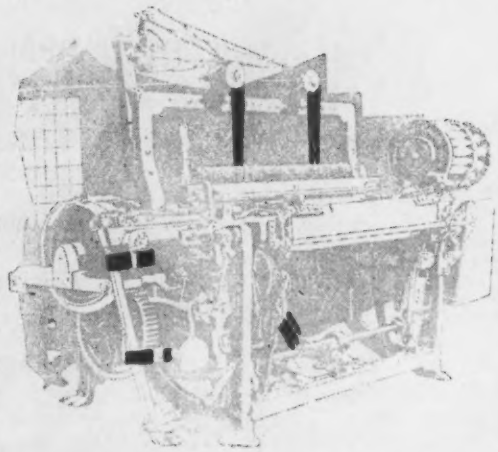

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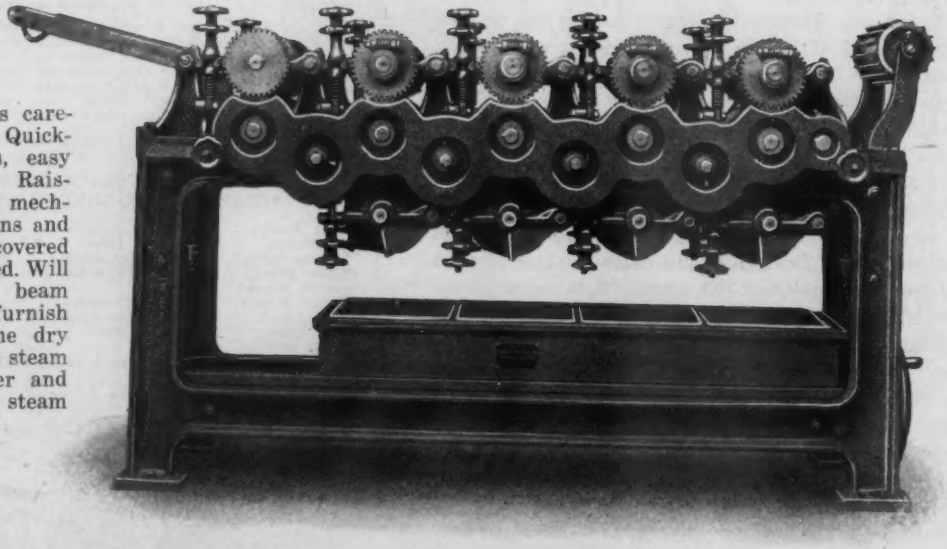

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hooking up a picker room. The method I like best is to have an automatic feeder followed by a Buckley cylinder, and that by a vertical opener, and then a two-blade beater section with the necessary screens and fans.

On this style of breaker picker, I would use the old-fashioned mix, opening 30 to 40 bales at one time and pull it apart and mix it thoroughly on the floor. I am confident that this is a better method than using a bale breaker. However, good success can be obtained by using a bale breaker and vertical opener, preceding the breaker picker. If preferred, the vertical opener could be left out, using a two-beater section breaker picker.

Two breakers and two finisher pickers will put through enough work for a mill of this size and leave time for mixing. If the latter method of picking is used, I would run the vertical opener at about 750 r.p.m., and the fan at 1,200 r.p.m. On the breaker picker I would run the Buckley beater 350 r.p.m., the fan 825 r.p.m., the blade beater 950 r.p.m., and the fan 825 r.p.m., producing a 12½-ounce lap. If the first method were adopted, I would use the same speeds throughout, except the first fan, which should be about 1,100 r.p.m., to draw from the Buckley cylinder through the vertical opener. On the finisher picker I would advise a beater speed of 1,050 r.p.m., fan 1,100 r.p.m., and make an 11½-ounce lap. The picker room production would be about 3,600 pounds per day to allow for the waste from cards and combers.

Coming to the card, we have the most important process in the card room. I would advise a cylinder speed of 165 r.p.m., licker-in, 450 r.p.m., draft 110, allowing 6¼ per cent for strips and fly; 42-grain sliver. We must produce 3,200 pounds per day on the cards. Allowing ten per cent for stripping, grinding and oiling, we should get 50 pounds per card, using a doffer speed of 5½ r.p.m. Then we would need 64 cards to keep up our production. As to settings I would advise: Doffer, 7/1000; flats, 7/1000; licker-in, 10/1000; knives, 10/1000; feed plates, 12/1000. And not set loose, either. I would advise having three cards ground per day and thoroughly cleaned and one card per day set. The flat grinder should always be about two cards ahead of the traverse grinders, and two hours is long enough for flats to be ground. A burnishing brush should never be used; this takes the edge from the wire, thus removing all the good from grinding.

On the combers, it is specified in the inquiry that they shall not go over 100 nips per minute. At this speed I should advise the Nasmith type of comber. It would be foolish to put in the Whitin type at this speed, as the number required and smaller production would prohibit them. A 43-grain sliver at this point is about right. The Nasmith type comber at 100 nips will produce about 110 pounds per day. This would mean 23 combers, but it would be better to run 90 nips per minute and produce 100 pounds a day. The work would be much better This would require 25 combers, but I would advise that 30 be installed as the combing should be done thoroughly. If it was intended to use the Whitin comber at 100 nips, the production would be 70 pounds per day, which would take at least 36 combers, so that one can see the folly of installing this type, although it must be admitted that the work would be good. On the Nasmith type we should have to make a lap 500 grains per yard, doubling six, taking out 20 per cent waste, with a draft of 58 to produce a 43-grain sliver. Using the Whitin

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type of comber, I would advise making a 400-grain lap, doubling eight, taking out 20 per cent and drafting 60 to produce a 43-grain sliver.

To make a 500-grain lap for the comber, use a 500-grain doubler lap, draft 4. Do not run the front roll over 400 r.p.m. unless necessary. It is very hard to figure the production from the lap forming processes, due to the fact it is hard to get efficient help. The ordinary hand cannot do more than one-half the catalog rated production. The most common practice in this section is one doubler and one ribbon for six combers. Some mills make one frame feed eight, but the average hand cannot do it. The doubler should have 20 ends up, draft of 1.68.

To make a 400-grain lap, 20 ends up, draft of 2.1, double four on the ribbon frame, draft 4.

Too much care cannot be used in hiring the comber foreman. He must be a man strictly honest and frank, one who can control the help on his section. He must see that the ribbon tenders let no bunches or clearer waste run through. This breaks the needles badly. He must also see that the workers scour the doublers and ribbon machines often. Also clean and overhaul, time and set one comber each week.

To give an idea of the efficiency of the comber, our experience, through the use of hank clocks, is that a comber will produce 93 per cent of the figured 100 per cent production. This includes the stopping of one comber per week to be re-set and timed.

On the drawing frames, I would advise a front roll speed of 300 r.p.m. At 100 per cent this would give 175 pounds per day per delivery, which at 70 per cent would be 125 pounds. This would require 20 deliveries, so it would be best to get five frames of four deliveries each for each process of drawing. I would not fail to put in three processes of drawing. A comber produces sliver that varies not so widely as a card but not so evenly. Combed work is harder to keep even than is carded. I have seen mills on combed work with only two processes, but these same mills are putting in another line at the present time.

With a draft of 5.5 on each drawing, we will produce a 47-grain sliver on the breaker drawing, 51 grains on the intermediate and 55-grain sliver on the finisher. I would use twelve-inch cans on all carding, combing and drawing frames; ten-inch cans are a thing of the past. I would not run combed work without spring bottom cans.

Using the 55-grain sliver, draft of 4.33, I would produce a .65-hank roving on the slubber, front roll speed, 200 r.p.m., giving a production of 19 pounds per day per spindle. This would require two slubbers, 12x6, 68 spindles, twist per inch, .73, twist multiplier, .90.

Using the .65-hank roving, draft of 4, making 1.30 hank roving on the intermediate, 175 r.p.m., front roll speed, 120 spindles per frame, twist per inch 1.15, twist multiplier 1.00, 10x5 intermediates, 8.25 pounds per spindle per day. This requires three frames.

On the roving frames it will be advisable to make two hank roving for the warp. Using the 1.30-hank roving, draft of 5.08, making 3.30 hank roving, 135 r.p.m. front roll speed, 176 spindles per frame, with 2.00 twist per inch, 1.10 twist multiplier, on 8x3½ frame, would give 2.5 pounds per spindle per day. For 1,500 pounds of warp, we would require four frames.

Using the 1.30-hank roving, draft of 6, producing 4.00 hank roving for filling, with 120 r.p.m. front roll speed, 2.20 twist per inch, 1.10 twist multiplier, on 8x3½ frames, 176 spindles, would give 1.90 pounds per spindle per day, requiring three frames for 1,000 pounds of filling.

On the jacks, we will make 10.00-hank from 3.30, with 100 r.p.m. front roll speed, 3.75 twist, 1.20 multiplier, 6x3 frame, 200 spindles per frame, giving .63 pounds per spindle, requiring 13 jack frames. Drafting 6.

Making 14.00-hank from 4.00 hank, draft 7, 85 r.p.m. front roll, 4.50 twist, 1.20 multiplier, 6x3 frame, 200 spindles each, would give .40 pounds per spindle, requiring 13 jacks.

We use 1¼-inch front and back rolls, 1-inch middle roll. This gives fine results, using the same on slubbers, intermediates, roving and jacks, so I would hesitate to advise as to roll diameters, never having used smaller rolls on this class of work. As for roll settings on jacks, set 1/16 inch over staple front to second; 3/16 inch middle to back. Roving and intermediate frames, ⅛ inch front to second; ¼ inch second to back. Slubbers, 3/16 inch front to second; 5/16-inch second to back.

In regard to the help required, I would say: One overseer, one second hand, one boss picker, two picker men, one boss grinder, one helper, three strippers, one ribbon tender, four machines, two ribbon tenders, three machines, five comber tenders, six combers each, one boss comber and one helper, one waste man, three drawing tenders (drawing frames to be under boss comber's supervision), one speeder third hand, one slubber tender, three intermediate and roving tenders (in laying out intermediates, pair up one intermediate and one roving, which will make an easier job for the operative and increase production), two roving girls, thirteen jack girls, one scrubber, two doffers for intermediate and roving frames, two doffers for jacks, doffers to do the sweeping, one oiler (oiler to hoist roving on thirteen jacks), one roving hoister for intermediate, roving and 13 jacks.

As to supplies, there would be about 250 laps sticks, for 40-inch cards, 60 10-inch spools for the doubler, 600 12-inch spools for the ribbon machines, 1500 12-inch cans for cards, combers and drawing, 4,000 12-inch slubber bobbins, 5,000 10-inch intermediate bobbins, 15,000 8-inch roving bobbins, 90,000 6-inch jack bobbins.

R. F. D. (MASS.)

Unanswered Fly Frame Questions.

EDITOR COTTON:

In the March 1927 issue of COTTON, I see where "D.E.(R.I.)" comes back at me very hard. Now I would be grateful to "D.E." if he would let me know in what issues of COTTON my questions were answered. The question follows:

(1) A fly frame run at a very low speed calls for a slacker rack gear, which means a larger movement of the rack at every change of the carriage, and at the finish of the set the cone belt will be found at about three-fourths of the working area of the cones. Figure it out.

(2) Why do the cones on the Howard and Bullough frames have different outlines from that of the Whitin or Sáco-Lowell frames?

(3) The diameter of the strand does not remain the same. As a matter of fact, the strand as it is laid upon the bobbin is of a less diameter, or occupies less space at the beginning than it does at the finish of a bobbin. This

increase is very gradual, but constant, and is caused by the presser condensing the strand. The cones may be figured out theoretically correct, but with the foregoing in mind, also the different types of flyers and compounds, how is it figured by equations?

(4) Does a change in its own speed affect the outline of the bottom cone?

"H.H.Y." states, "as the two axes of the cones are parallel, and as the length of the belt is constant, it is obvious that at any point the sum of the two diameters plus the distance between the axes must be equal to a constant in order that the belt will not run loose at one time and tight at another."

"Contributor No. 231" states "The cones are constructed concave and convex because the sum of the opposite diameters of the two cones must be kept uniform, all along their entire length. This is so the cone belt will maintain an even tension at all times."

If the foreging is true, how is it possible to run Dunn flyers?

In order to run Dunn flyers, the bottom cone must have straight outlines. I wish "H.H.Y.", "D.E." and "Contributor No. 231" would explain.

"D.E." classes my work as old stuff. He should read what the editors say on the next page to his statement: "Good stuff is never old stuff."

Cones may be figured theorectically correct, before the additional factors of slippage or difference in tension between the empty and full bobbin due to the slight variation in the pressure of the paddle and the difference in the diameter as the bobbin builds up, the other factors are considered and a pair of cones can be figured out correctly by mathematical methods.

After these mathematically correct cones have been arrived at, several other factors including the aforementioned, have to be reckoned with and the form of the cones modified.

Each of these factors in part, can be arrived at mathematically, but some, such as the amount of compression in the building up of the bobbin, certainly at least have been checked up, in addition to a mathematical computation. Therefore, the cones have to be modified to get a uniform tension from empty to full bobbin.

In the December issue of COTTON "Contributor No. 231" writes an article entitled "Roving Frame Cones." He terminates his article by asking the following questions: "Why couldn't we have a speeder constructed with the variable speed coming on the spindle instead of the bobbin?"

The animating spirit of a collective body, is worded "esprit de corps." The twist gear on a fly frame is the "esprit de corps" of the frame. In other words, the twist gear is the heart of the collective body. Cut the heart out of anything and the remainder is worth very little. "D.E." states in his article "Wash" likes to question the other fellow a lot, and "that would be perfectly in order if he would give the informer some credit instead of declaring that the other fellow is wrong most of the time." The difference between myself and "D.E." is, I am wrong some of the time, and he is wrong most of the time.

In the January issue of COTTON "H.D.(Mass.)" proved himself a practical speeder man as regards the pressure of the paddle. In the March issue of COTTON "L.A.S. (Mass.)" does likewise. Both of these men know what they are talking about.

WASH (R.I.)

How to Run a Successful Section.

EDITOR COTTON:

Perhaps a discussion of the method used at our mill by the section men will be of interest. After placing the help, the first thing they do is check up on the ends broken back and put all "dead-heads" to running. Then all the belts are examined to see that they are in good order. The section men then walk the back alley, examining all gearing and seeing that all the frames are in good running order, fixing any defects found.

The frame hands are never allowed to use a wrench. That is one thing that will put a section man's job in a hole quicker than anything else. Another thing that will cause trouble is a chronic grumbler. They should be disposed of as soon as possible in order to save trouble later on.

Another feature emphasized at our plant is to keep the floors clean at all times so that any fire that might occur will not spread.

One of the most important things is to see that the oiler oils at the right place and correctly. One drop of oil at the right place is worth a barrel on the floor.

T. I. (S. C.)

Causes of Rowy and Wavy Cloth.

EDITOR COTTON:

I note what "B. T. (S. C.)" says about his trouble with rowy and wavy cloth as a result of an uneven let-off, in a recent issue of COTTON.

His trouble is on a Stafford loom, but I have had quite a lot of experience along this line on the Draper loom with the chain let-off. The thing that saved my life once was a piece of leather about 16 inches long and the width of the flange of the beam on which the chain works. I cut a slot in one end of this strip of leather and put the chain through it and fastened it with a pin to hold the leather on top of the beam between the chain and the flange. One piece of leather is all that is necessary. The flesh side of the leather should be next to the flange of the beam.

This will require some attention. There must be enough weight on the lever to hold it down. If there is not enough weight, the leather will hold to the beam and pull the lever up against the warp. In some instances, I can take the chain off the opposite end of the beam and sometimes it will be necessary to single the chain on the end where the leather is on.

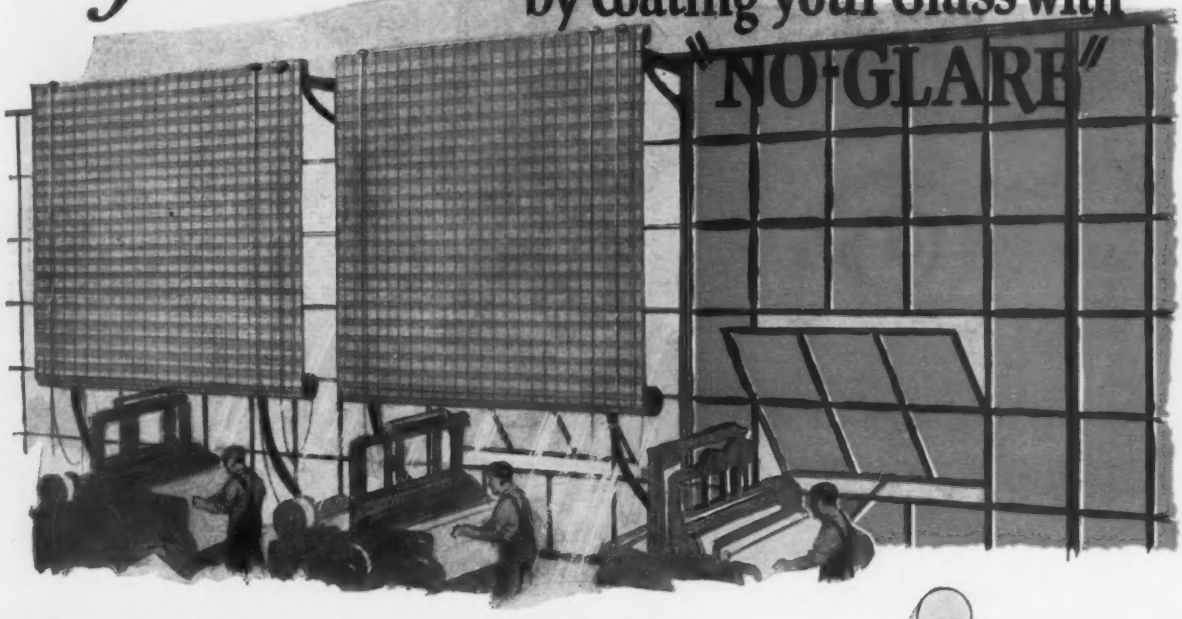
This remedy is just like everything else. It requires attention at times and the weavers have to be educated to it.

Now as to greases, the most successful thing I have ever used for this purpose is tallow. I had that melted in a bucket over the size kettle and applied it to the beam flange with a brush while the warp was being run on the slasher. This helps quite a lot and in some instances is all that is necessary. It is a good practice to keep this up whether there is an uneven let-off or not. Just as soon as the flanges of the empty beams get rusty, I like to have the tallow applied.

(*Continued on page* 1277.)

Save the Expense of Window Shades!

by Coating your Glass with "NO-GLARE"



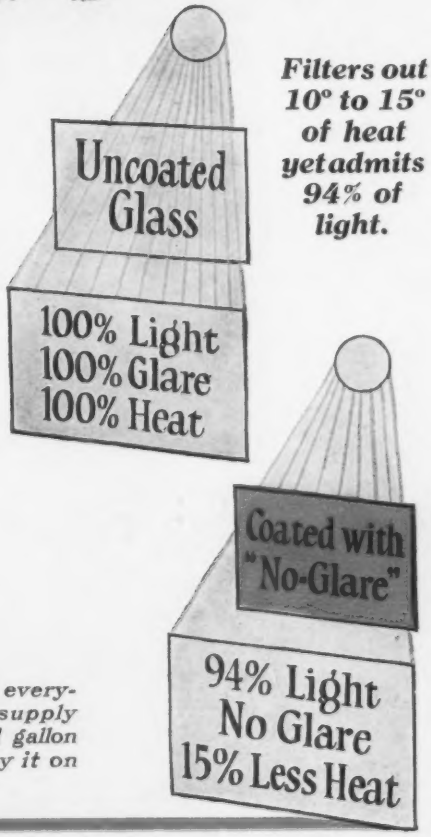
SKYCO No-Glare has all the advantages of window shades and blinds and none of the disadvantages. *No-Glare* is a sky-blue liquid that when painted or sprayed on the window forms a translucent film that *filters the sunlight*, admitting 94% of light but eliminating the glare and from 10° to 15° of the heat. Thus you get a *diffused* light that is ideal, cool and restful.

The use of *No-Glare* eliminates the expensive installation and maintenance of window shades and saves the time spent in adjusting the shades two or three times a day to meet the changing light conditions.

Goes on OUTSIDE of Glass—yet rain or weather conditions do not effect SKYCO No-Glare. Neither will it rub, or flake off. Yet you can remove it easily with warm water and a brush. *Just as effective if applied on inside of glass.*

Very economical—costs less than ½¢ per square foot of glass coated. One application lasts through the sun-glare season.

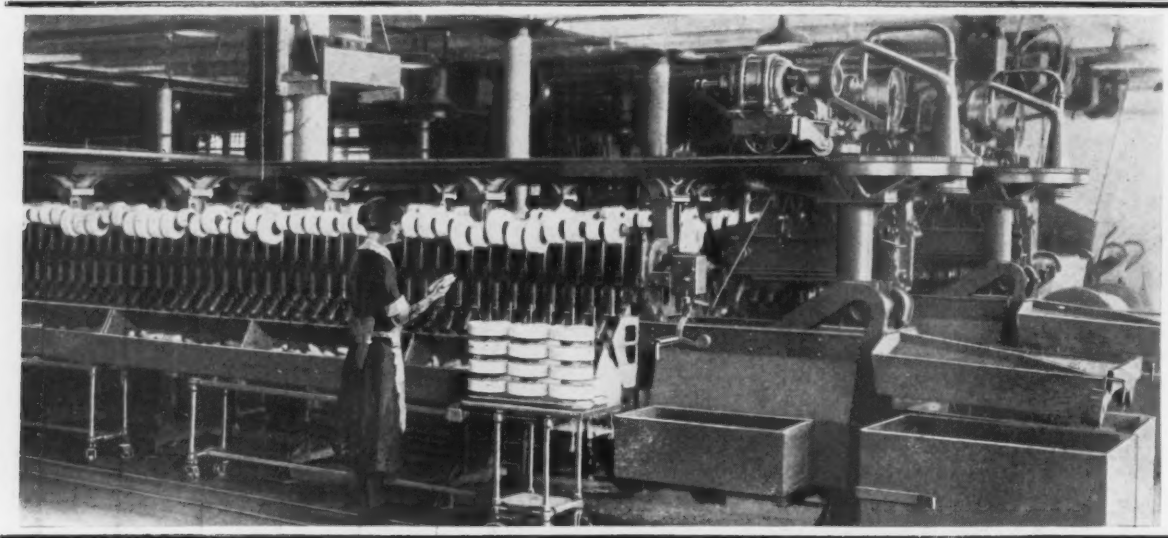
THE SKYBRYTE COMPANY
1190 HANNA BUILDING, CLEVELAND, O. *Chicago Branch: 104 So. Michigan Ave.*



Filters out 10° to 15° of heat yet admits 94% of light.

SKYCO No Glare

Used by textile mills everywhere. Sold by mill supply houses. Order a trial gallon today at $3.50 and try it on a "glary" window.



ON SEPTEMBER 1, 1927, 53 REPRESENTATIVE COTTON

232 AUTOMATIC SPOOLERS

ALICE MFG. CO.,
Easley, S. C.

ANDROSCOGGIN MILLS,
Lewiston, Maine

ARAGON-BALDWIN COTTON MILLS,
Whitmire Plant,
Whitmire, S. C.

AURORA COTTON MILLS,
Aurora, Ill.

BEAR BRAND HOSIERY CO.,
Kankakee, Ill.

BEMIS BROS. BAG CO.,
Bemis Cotton Mill,
Bemis, Tenn.

BRANDON MILLS,
Greenville, S. C.

CABARRUS COTTON MILLS,
Kannapolis, N. C.

CANNON MANUFACTURING CO.,
Kannapolis, N. C.

CLIFTON MANUFACTURING CO.,
Clifton, S. C.

CLINTON COTTON MILLS,
Clinton, S. C.

CROWN COTTON MILLS,
Dalton, Ga.

DALLAS MANUFACTURING CO.,
Huntsville, Ala.

DAN RIVER COTTON MILLS,
Danville, Va.

EDWARDS MANUFACTURING COMPANY,
Augusta, Maine

ESMOND MILLS,
Esmond, R. I.

EXCELSIOR MILLS,
Union, S. C.

JOHN FARNUM COMPANY,
Lancaster, Pa.

FIRESTONE COTTON MILLS,
Fall River, Mass.

FISK RUBBER CO.,
Pawtucket Plant,
Pawtucket, R. I.

FRANKLIN COTTON MILLS,
Concord, N. C.

GAINESVILLE COTTON MILLS,
Gainesville, Ga.

GREENWOOD COTTON MILLS,
Greenwood, S. C.

HANNAH-PICKETT MILLS,
Rockingham, N. C.

HOME COTTON MILLS,
St. Louis, Mo.

INDIANAPOLIS BLEACHING CO.,
Indianapolis, Ind.

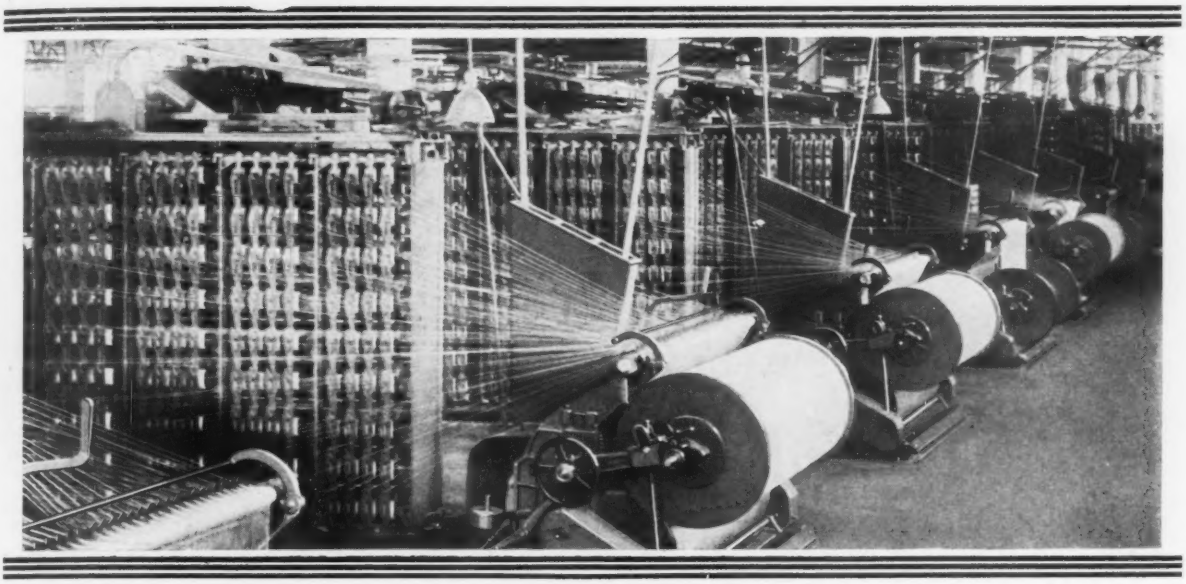
KESLER MFG. CO.,
Salisbury, N. C.

BARBER-COLMAN COMPANY

GENERAL OFFICES AND PLANT

ROCKFORD, ILL., U. S. A.

FRAMINGHAM, MASS.



MILLS WERE USING OR HAD ON ORDER

176 HIGH SPEED WARPERS

JOHN P. KING MANUFACTURING CO.,
Augusta, Ga.

LITTLE ANDROSCOGGIN WATER POWER CO.,
Barker Mills,
Auburn, Maine

LYDIA COTTON MILLS,
Clinton, S. C.

MANCHESTER COTTON MILLS,
Manchester, Ga.

MONARCH MILLS,
Lockhart Plant,
Lockhart, S. C.

MONARCH MILLS,
Monarch Plant,
Union, S. C.

MONARCH MILLS,
Ottaray Plant,
Union, S. C.

MORGAN AND HAMILTON CO.,
Nashville, Tenn.

NINETY-SIX COTTON MILLS,
Ninety-Six, S. C.

NAUMKEAG STEAM COTTON CO.,
Salem, Mass.

PACIFIC MILLS,
Capital City Plant,
Columbia, S. C.

PACIFIC MILLS,
Cocheco Dept.,
Dover, N. H.

PACIFIC MILLS,
Lawrence, Mass.

PATTERSON MFG. CO.,
China Grove, N. C.

PEPPERELL MANUFACTURING CO.,
Biddeford, Maine

POINSETT MILLS,
Greenville, S. C.

ROXBORO COTTON MILLS,
Roxboro, N. C.

A. M. SMYRE MANUFACTURING CO.,
Gastonia, N. C.

STANDARD-COOSA-THATCHER COMPANY.
Chattanooga, Tenn.

STANDARD-COOSA-THATCHER COMPANY,
Piedmont, Alabama.

TRION COMPANY,
Trion, Ga.

VICTOR MONAGHAN CO.,
Apalache Plant,
Arlington, S. C.

VICTOR MONAGHAN COMPANY,
Monaghan Plant,
Greenville, S. C.

VICTOR MONAGHAN COMPANY,
Victor Plant,
Greer, S. C.

WALLACE MFG. CO.,
Jonesville, S. C.

WOODRUFF COTTON MILLS,
Woodruff, S. C.

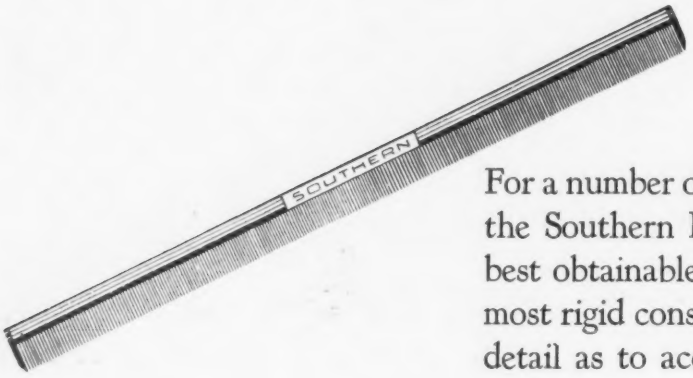
BARBER-COLMAN COMPANY

GENERAL OFFICES AND PLANT

ROCKFORD, ILL., U. S. A.

GREENVILLE, S. C.

In the Eyes of the Textile Engineer



For a number of years textile men have regarded the Southern Reed for working Rayon as the best obtainable. Only reeds of the finest steel, most rigid construction, and perfection in every detail as to accuracy can acquire such distinction.

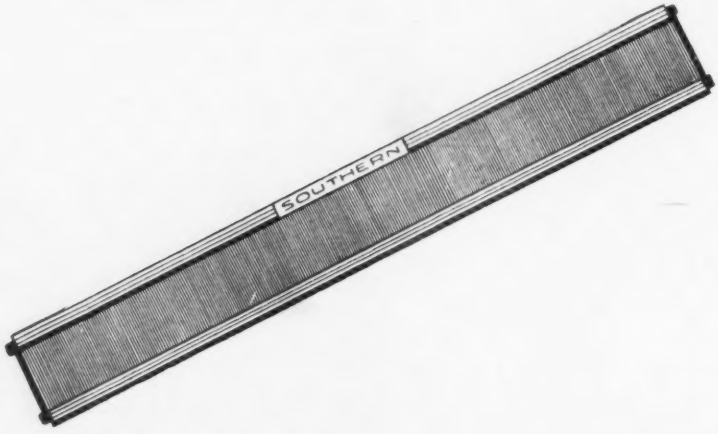
We also build reeds for working cotton.

Your requirements will be given our utmost personal attention.

SOUTHERN LOOM-REED MANUFACTURING CO.
Manufacturers and General Overhaulers
Greenville, S. C. Campobello, S. C.

Just A Word!

to thank our many friends for their attendance at our annual barbecue held October 1. We hope that everybody enjoyed it and will be with us again next year.



Southern
Combs and Reeds

At Auction

In Complete Liquidation

The Entire Holdings of the

RENFREW MANUFACTURING CO.

ADAMS, MASSACHUSETTS

To Be Sold on the Premises

NOVEMBER 1, 2 AND 3, 1927

Starting at 10 A. M. Each Day

REAL ESTATE—Valuable Mill Buildings of modern daylight construction and with every modern convenience. Over 100 attractive residences and dwellings. Parcels of unimproved real estate. The real estate will be sold in separate parcels.

MACHINERY AND EQUIPMENT includes 5 Whitin breaker and finishing pickers, 55 Whitin 40-in. cards, 18 Whitin drawing frames, 4 Whitin slubbers, 8 Whitin intermediates, 30 Whitin and Providence roving frames, 5 Whitin spinning frames, 28 Whitin spoolers, 22 Draper and Hopedale 54-in. warpers, 15 Draper twisting frames, 15 Universal winders, 6 Saco Lowell and Lowell slashers, 48 beam frames, 38 Whitin quillers, Barber Colman warp tying machine, 1000 Crompton & Knowles looms, 384 Crompton and Stafford automatic damask looms with motors, 594 Crompton and Stafford automatic shorting looms with motors, 389 Crompton, Schaum and Uhlinger single and double shorting looms with motors, 389 motors, 3 Butterworth 90-ft. dryers, 2 Textile Finishing Machine Co. dryers, Butterworth 3 to 7 roll calenders, inspection machines, 60-ft. mercerizing machine, Singer and Wilcox & Gibbs sewing machines, dyeing and washing machines, 90-ft. Butterworth and textile tentering machines, Butterworth mangles, two- and four-ton kiers, 150 1 to 50 H. P. electric motors, 5 Ingersoll Rand air compressors, lathes, drill presses, planers, plumbing supplies, electrical supplies, machine shop supplies and equipment, office furniture and office equipment, etc.

BY ORDER OF THE BOARD OF DIRECTORS, RENFREW MANUFACTURING CO.

Write for

(*a*) *Illustrated Book-map of the Real Estate.*

(*b*) *Detailed descriptive catalog of the machinery and equipment.*

SAMUEL T. FREEMAN & CO.,

Auctioneers

80 FEDERAL STREET
Boston, Mass.

1808-10 CHESTNUT STREET
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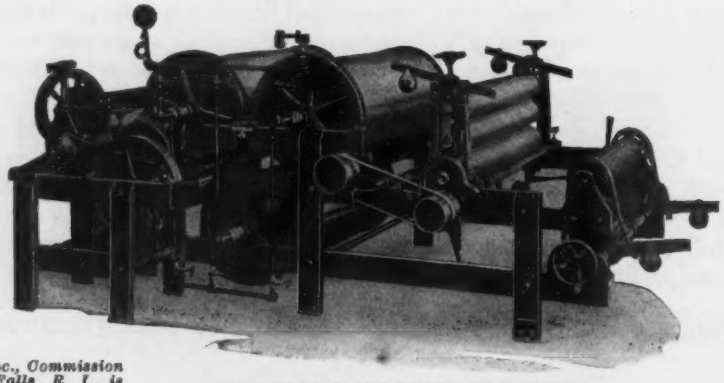
COTTON MILLS making Rayon fabrics are confronted with new problems of selling and financing. The Textile Banking Company, 50 Union Square, New York, specializes in Factoring such accounts and will be pleased to hear from manufacturers who desire to perfect new selling arrangements, or who are interested in Factoring services in connection with their own selling organizations.

Textile Banking Company

Fifty Union Square New York

FACTORS

THE JOHNSON WARP-SIZING MACHINE



The R. I. Warping Co., Inc., Commission Warp-sizers, of Central Falls, R. I., is one of our more recent customers. Mr. E. G. Hayward, Pres. of the Company, says:

PATENTED WARP-SIZING MACHINE 81

"YES, WE HAD GOOD RESULTS IN SKEIN-SIZING—BUT IT CANNOT BE COMPARED TO THE WORK WE TURN OUT ON OUR JOHNSON WARP-SIZING MACHIINE.

"WE NOW MAKE WARPS THAT WEAVE WITHOUT A HITCH."

CHARLES B. JOHNSON ∴ 10 Ramapo Ave. ∴ Paterson, N. J.

British Representative
TEXTILE ACCESSORIES, LIMITED
Manchester, England

ASK FOR *CIRCULAR DEMONSTRATION*

Southern Representative
GIBBONS G. SLAUGHTER
Charlotte, North Carolina, U. S. A.

(*Continued from page* 1270.)

Another thing which will help eliminate uneven or wavy cloth is to have the harness set properly. That is, have the harness set so there is the same amount of strain on each shed. This can be done by watching the beam let-off and noticing which harness is down as the beam lets off. Also, the beams should not bind anywhere, and the journals must not be loose. I also have better luck with the edges of the chain next to the flange instead of the flat sides.

JACK (TEXAS).

EDITOR COTTON:

Answering the question of "B. T. (S. C.)" in regard to rowy or wavy cloth on a chain let-off, I will say that if I were in his place, I would see that the beam head and chains were cleaned with gasoline, and keep all cup grease off of them. I would also use about ten drops of good lubricating oil each day. Next, I would see that the harness was properly set, and if using a vibrating whip roll, would set the vibrating cam ¼-inch from the beat of the cloth.

The take-up roll bearing should not be worn so there is lost motion. If it is worn enough to have lost motion forward or backward, a take-up roll bearing will cause wavy cloth just as will the let-off. Also, if a change gear stud is worn it will cause the change gear and the pick wheel gear to run too tight, resulting in rowy cloth.

If "B. T. (S. C.)" will follow these suggestions, I feel sure his trouble will be greatly reduced.

T .A. D. (GA.)

EDITOR COTTON:

This is in reference to the trouble reported by "B. T." who stated he is having rowy or wavy cloth on Stafford looms using the chain let-off of the weight and lever type. His constructions range from 72x76 to 60x48. He said he had traced most of this to the let-off gumming up or jumping.

As to the friction chains, they should go around the beam head twice with a chain on each beam head, and use any good grease to give the necessary results.

W. B. (N. C.)

EDITOR COTTON:

In the July issue, "B. T. (S. C.)" requests information on how to prevent rowy and wavy cloth on Stafford looms with a friction let-off. He also says he has tried greases of different kinds, requesting some kind of preparation to use on the beam head and chain.

In my opinion, the fact that he has been using grease is the cause of a lot of his trouble. I would not use grease or oil of any kind for the reason that any oil or grease applied to a beam head or chain in a loom will become gummy and cause the chain to stick and let off unevenly. I have never seen grease or oil used here with satisfactory results.

The best thing I have ever found for an uneven friction let-off is to clean the chain and beam head, removing all gum and grase, and see that the chain connections are in line so they won't bind on the beam head.

For a rusty chain or beam head, I have used graphite with good results.

With the beam head and chain properly cleaned, and the harness correctly set, I have never experienced any dif-

Bulletins of Results

WASHBURN WOOD TOP ROLLS

—for—

SPINNING FRAMES

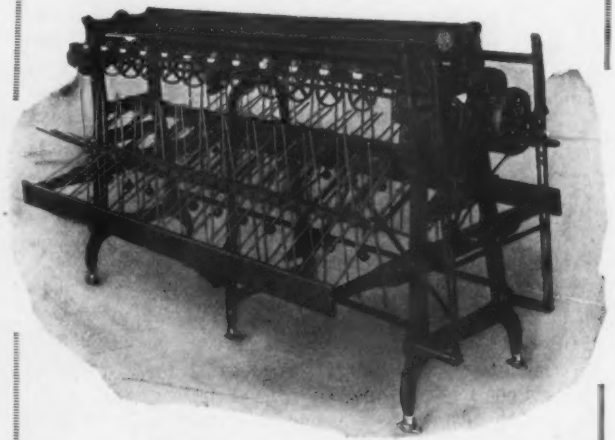
Number Yarn	50
Twist Square	4.50
Turns per inch	31.82
Staple	1¼"
Kind—Combed Peeler	
Hank Roving used	5.85D
Draft	16.80
R.P.M. Spindle	9300
R.P.M. Front Roll	94
Weight Top Roll	1100 grs.
Average Size	49.10
Average Break	42 lbs.

The above is a record of a test recently made using roving taken at random from a New Bedford mill.

224-234 No. Water St., New Bedford, Mass.

Winding, Warping and Special Machinery for Rayon

Steel frame construction and patented rigid traverse motion.
Write for circular No. 10



Type BO. Skein Winder for Rayon, Silk and Mercerized Yarn.

THE SIPP MACHINE COMPANY

PATERSON, N. J.

Southern Representative:
GIBBONS G. SLAUGHTER, Johnston Bldg., Charlotte, N. C.

ficulty in producing a smooth, even cloth with a lever friction let-off.

If, after removing all grease and gum from the beam head and chain, this man still has wavy cloth, I would suggest that he check closely the timing and setting of the harness. J. E. S. (N. C.)

Back Filling on the Tommy Dodd.

EDITOR COTTON:

I note the articles from correspondents in the August issue of COTTON on back filling on the Tommy Dodd, and am interested in the formula suggested by "Contributor No. 4341."

The following formula for a 110 gallon mix might prove of interest to your inquirer, as it is in successful use. He would have no trouble from sticking or puckering, and the filling will not dust or crack. The binder used, gum tragasol, produces what I believe to be the best possible results and is superior to rosin size: 75 pounds of corn starch; 50 pounds of potato starch; 165 pounds of tale; 165 pounds of lime; 50 pounds of grease softener; and 35 pounds of gum tragasol.

Back fill with the foregoing and then pure starch with 50 pounds of potato; 50 pounds of corn; 25 pounds of gum tragasol, to make 110 gallons.

I trust this will be of some aid to your inquirer in his difficulty.

S.J.P. (MASS.)

Anent the Alibi Hound.

EDITOR COTTON:

Please allow me space for a few words on "Passing the Buck," or placing our own faults on the other fellow.

Many mills have a rule to the effect that they will not work an overseer of weaving longer than six months to a year, and why is this? For the simple reason that some overseers pack all of their faults on their brother overseers.

If seconds are too high, the cloth room overseer is a real "old joy killer," and cares for the joy of no one but himself. He will "make rags just to spite the weaver," and "bad reports simply to make the superintendent think he is on the job." If he gets out for a few minutes conversation with the other fellows they say "he is not on his job and does not know whether the cloth is bad or not," while at the very same time the weaver will sit in the office, smoking cigars, until the office doors are closed to get rid of him.

The spinner is quiet about his part until he is approached by the superintendent concerning it. He is asked how many yards of blue, black or green, and will answer, "I ran 18,000 yards of blue, 20,000 of black and 22,000 of green." "Well," the superintendent will answer, "We are short 1,000 yards—" probably of one or two of the colors mentioned. Then the spinner comes back with "Well, I can't keep that weaver from wasting it. You know he makes 50 to 100 yards of waste every time he changes sets. He allows his draw-in hands to waste five and six rounds on every beam. Fixers make three or four yards of rags and waste every time they tie on a warp, and when they cut one out they pull off a roll of waste 25 to 30 feet long, and by the way, that old slasher man made two break-outs on the slasher on that last set of blue and wasted about 75 yards or more, and that's where your yardage is going and the reason you are not getting the proper yardage desired."

By this time the superintendent is disgusted and goes on to the card room, where a conversation on this order takes place:

"Mr. Carder, I notice that our cloth is running heavy again."

"Yes," says the carder, "every time I get my numbers right that spinner changes gears on me and makes it too heavy. He even ran warp yarn on the filling frames, and he changes everything backward just to make it hard on me, and that old pessimist of a weaver puts on a pick gear one tooth too high, trying to make his work run good. The cloth room man has his scales out of fix and hasn't got sense enough to fix them, and he don't care noway, just so he has something to grumble about. They grumble if we speak to them; they grumble if we visit them; and they grumble if we don't."

And so it goes. The superintendent visits all the overseers on his general tour through the mill, then he goes back to his office, sits down, lights his cigar and begins to scratch his head and think over the situation, his conclusion being that he has a rotten bunch. His mind begins to run to other men in the field, men who are laboring under better conditions, perhaps, and this is where he starts thinking of making a change.

My advice to those in every department would be that instead of "passing the buck," always be truthful and honest with your superintendent, as "An honest confession is good for the soul." An overseer should always be where he can be found, and should be ready with a quick and informative answer to any question concerning his job, and he should speak well, rather than ill, of his brother overseers; in other words, by helping others, you help yourself. CONTRIBUTOR NO. 636.

New Rolls and Neps.

EDITOR COTTON:

Not long ago I received a letter from a friend of mine who wanted to know what causes a newly covered top drawing roll on fly frames to make neps.

This is not the first time this claim has come to my attention. That is why I thought I would give you my opinion on the matter for the benefit of COTTON'S readers.

Neps are not made on any machine following the card. The reason why more neps appear with a newly covered roll is due to a clearer cloth worn smooth on the clearer. The surface of a newly covered roll is rougher than the old one and plucks the neps collected by the clearer. The only remedy is to re-cover the clearer with the proper flannel cloth and the trouble will disappear, that is if the licker-ins are in proper shape.

WASH (R.I.)

"The Artificial Silk Handbook."

This is the title of a treatise dealing with the producing, processing and manufacture of artificial silk or rayon, compiled by Frank Nasmith, editor of the Textile Recorder and the Silk Journal. This is the second edition, new material relating to finishing and printing, and sizing, artificial silk, etc., having been added with the statistical matter brought up-to-date. The price per copy is 3 shillings, 9 pence, net. The publishers are John Heywood, Ltd., Deansgate, Manchester, England.

Knitting Section

New

SPIRAL FLOATING STRIPING MACHINE

BUILT INTO MODELS HH—K—B

BUILT in sizes 3¼ inches up to 4 inches in diameter. Can be equipped with as many as six yarn changing fingers, which gives a range of five different col rs under control of the pattern mechanism exclusive of heel and toe colors.

Fancy effects produced by the well known floating pattern system. The horizontal striping mechanism can be arranged to control either the facing yarn or the backing yarn. Two-color stockings can be knit with plain sole and high heel.

Attachments for producing the fancy effects can easily be thrown out of action, and machines produce plain stockings, as with any HH, K or B machine.

Established 1865

SCOTT & WILLIAMS

Incorporated

366 Broadway,
New York

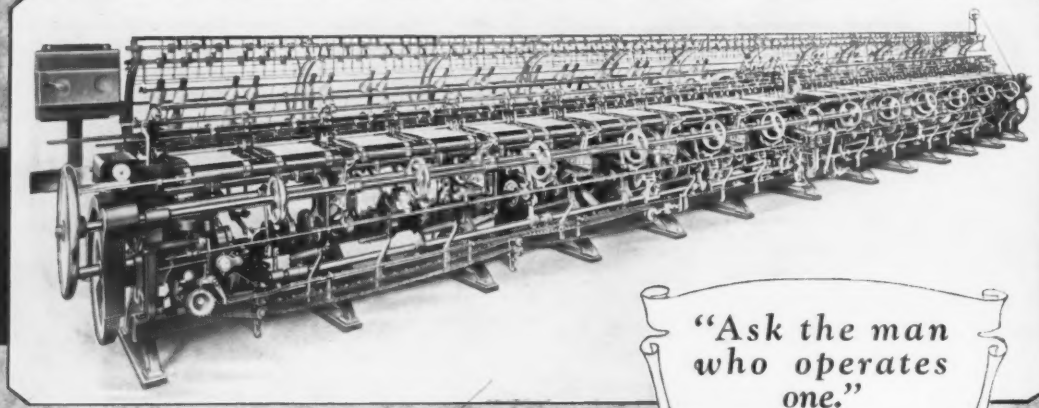
SCHUBERT & SALZER HIGH SPEED ··· TYPE H.S.L 24 SECTIONS

65 Courses Per Minute!

Plus fabric of highest quality!

That gives you a whale of an advantage over competition!

ALFRED HOFMANN
INCORPORATED
WEST NEW YORK - NEW JERSEY
Full-Fashioned Hosiery Machines



"Ask the man who operates one."

Southern Knitting Growth Featured by Development of Full-Fashioned Mills

Comments on the Expansion of the Southern Industry; Descriptions of New Full-Fashioned Mills; Other Knitting Progress

BY R. L. P. REIFSNEIDER.

Steady expansion of the full-fashioned hosiery industry in the South has reached a stage from which it may be viewed as having established additional industrial centers with the unfolding of opportunity, which is, obviously, the factor in the shifting of the centers of any given line or division of industry. At the commencement of the present decade there was not one establishment in any southern state equipped with full-fashioned or flat machines. Although the first was in Kentucky, the centers of production are in North Carolina and Tennessee, where the growth of the industry has been rapid, although along conservative lines. The pioneer mills have prospered and their success has blazed the way for a score or more manufactories now or soon to be operating, and probably as many more by the end of the decade.

With very few exceptions, the full-fashioned hosiery mills in the South represent southern capital almost exclusively. Their promoters may have felt they were taking a long chance, for interests with which they were to become rivals ventured the prophecy the South could not make fine hosiery, having no skilled full-fashioned operatives. Training knitters to compete in efficiency with artisans in localities where the industry had flourished for years necessarily was a slow process, but southern manufacturers, possibly with determination born of resentment, have given as complete refutation to the implication as one Lindbergh, a short time ago, gave to the assumption the air lanes between the hemispheres never would be successfully navigated. The full-fashioned hosiery industry has nosed its way to sections—South and West—where only a few years ago there were no skilled operatives, for the simple reason there was no employment there for them.

With an increase in the number of mills, there are, of course, more facilities for the training of operatives. A solution of the help problem has been reached, and it may be assumed that for this reason, leaving others aside, expansion of the full-fashioned industry will now be more rapid than in the past. One obstacle to satisfactory operation of plants is practically removed, and the southern field is becoming more attractive to northern capital, as instance the establishing of two mills in Greensboro, N. C., this year, one by the Mock-Judson-Voehringer Co., the other by F. Osborne Pfingst and Frank E. Curran, both Philadelphians, incorporated as the Greensboro Full-Fashioned Hosiery Mills. The latter is equipped with twelve 42 gauge, 24 section machines.

Expansion of the industry is to be measured by equipment rather than the number of additional mills. Usually the new establishments comprise more machines and more sections per machine than those in existence a few years, so that production has increased in greater degree than is indicated by the gain in number of mills. The South has comparatively few coarse gauge machines, all recent installation being, necessarily, of 42 gauge, on which fineness seems to be standardized for the time. Comparing with existing plant capacity, the per cent of new installation this year is said by competent authority to be greater in southern centers than in northern full-fashioned communities, despite there lurked the fear the industry at large was being over-expanded. During the summer there was some curtailment, but this is believed to have been less pronounced in the South. This might be ascribed to a lower operating cost and, in sequence, prices more favorable to buyers, but it is insisted there is little difference in manufacturers' prices as between sections. In any event, it is pointed out, manufacturing in the South is profitable, as otherwise there would be lacking the incentive for establishing additional mills.

In North Carolina the full-fashioned field, which was opened originally at Durham, by the Durham Hosiery Mills, is spreading westward, with plants since established in Albemarle, Burlington, Charlotte, Concord, Greensboro, and High Point, for a total

List of Full-Fashioned Mills in the South.

The following represents virtually a complete list of the full-fashioned mills in the South at the present time. As stated in the acompanying article, the number and size of machines is a better means of judging the extensiveness of the development, rather than the number of mills. It is believed, however, that this list will be of interest; especially when it is considered that this development has all occurred within the past decade:

Cooper, Wells & Co., Albany, Ala.
Claussner Hosiery Co., Paducah, Ky.
Wiscassett Mills Co., Albemarle, N. C.
Randolph Silk Hosiery Mills, Asheboro, N. C.
McEwen Knitting Mills, Burlington, N. C.
Charlotte Knitting Co., Charlotte, N. C.
Hudson Silk Hosiery Co., Charlotte, N. C.
Nebel Knitting Mills, Charlotte, N. C.
Hoover Hosiery Co., Concord, N. C.
Durham Hosiery Mills, Durham, N. C.
Golden Belt Mfg. Co., Durham, N. C.
Forest City Hosiery Co., Forest City, N. C.
Greensboro Full-Fashioned Hosiery Mills, Greensboro, N. C.
Mock-Judson-Voehringer, Inc., Greensboro, N. C.
Morganton Full-Fashioned Hosiery Co., Morganton, N. C.
Waldensian Hosiery Mills, Valdese, N. C.
Davenport Hosiery Mills, Chattanooga, Tenn.
Miller-Smith Hosiery Mills, Chattanooga, Tenn.
Magnet Knitting Mills, Clinton, Tenn.
Kingsport Hosiery Mills, Kingsport, Tenn.
Petersburg Silk Hosiery Mills, Petersburg, Va.

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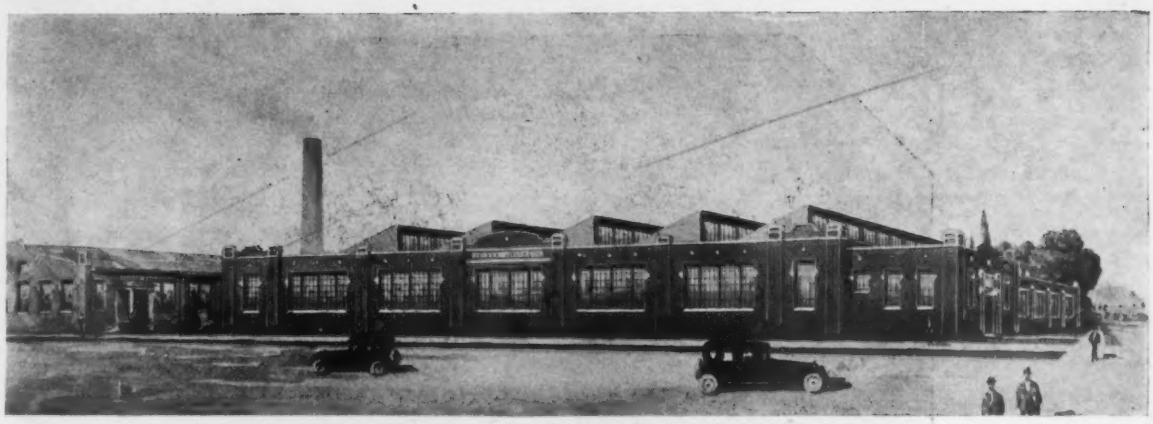

Cooper, Wells & Co., St. Joseph, Mich. (Albany Plant).

This company, which for six years has operated a seamless hosiery plant at Albany, Ala., has just started a full-fashioned plant in the southern city. The building, including the office, is 163 x 100 feet, and is designed to contain 42 full-fashioned machines. Nine 42-gauge Karl Lieberknecht machine constituting the initial installation, will be expanded as help is trained. This is the first full-fashioned mill in Alabama.

of twelve, according to a directory of the knitting trades for 1926, which makes no mention of several which began producing this year. At this writing there seems no doubt that in the very near future additional plants will be on full production basis in Asheboro, Morganton and Valdese, and there is good ground for saying that within the next twelve months ten or more new mills will have sprung up in North Carolina and Tennessee, and that several now operating will be enlarged.

One of the more noteworthy additions to the full-fashioned industry in the South is the somewhat recent installation by the Davenport Hosiery Mills, Chattanooga, Tenn., the success of which is emphasized by announcement a few weeks ago of the purchase of 14 new machines of fine gauge, and the further announcement that the Davenport will establish a retail store in the heart of the New York shopping district. Tennessee, the second of the southern states to establish a full-fashioned center, is promising of considerable expansion in the next few years. The boundaries that have marked the southern seamless hosiery areas seem likely to be observed for some time in the full-fashioned field, with the probability, however, that the industry will become more firmly planted in Virginia than at present.

As a great majority of the mills in the South are of quite recent origin, the equipment is of the more modern types, in which the machines of the Textile Machine Works, Reading, Pa., and Schubert & Salzer H. S. L., from Alfred Hofmann, Inc., are conspicuous as well as the Hillscher type. Reading machines were adopted for the first of the North Carolina mills and two that were established this year in Charlotte. There also is considerable installation of Schubert & Salzer and more contracted for, the two full-fashioned machine builders thus dividing honors and sharing in the progress of the South as a rapidly developing full-fashioned field.

In any forecast of the future of the South as a producer of fine gauge full-fashioned hose it might be well to keep in mind the development of the seamless industry, and not overlook some of the predictions that were made when first circular knitting in this section came to be given over extensively to silk hose of the finer types. A page out of the history of seamless expansion may serve to emphasize the point made by enthusiasts over the outlook for full-fashioned.

Using a standard directory of the knitting trades for the years 1916 and 1926 as a base of information, it appears there were in operation at the beginning of the decade 546 seamless mills, comparing with 625 accounted for last year, an increase of 14 per cent for the whole of the United States. Of the aggregate 220 mills were credited to Pennsylvania last year, a decline of 12 per cent from 1916, while in Philadelphia the number dropped to 57 from 77, a decline of 26 per cent. The total number of mills in nine southern states in 1916 was 120 and 207 in 1926, an increase of 72 per cent. North Carolina alone was shown to have 120 mills last year, comparing with 62 in 1916, an increase of 93 per cent. In the ten years, Georgia scored a gain of 45 per cent in number of seamless mills, and Tennessee 69 per cent. It seems a safe deduction that, as in full-fashioned, the per cent of gain in potential production as a whole was greater than in number of establishments, while the average seamless mill in the North represents less output than ten years ago.

(Editor's Note: The 1927 Directory of the Knitting Trades accounts for one full-fashioned mill in Kentucky, 16 in North Carolina, four in Tennessee and one in Virginia. The same edition of the directory gives 598 as the number of seamless mills in the United States, which is 27 less than shown in 1926, but makes no change in the number in the southern belt, standing at 207.)

It will be recalled that in the early stages of the seamless industry in the South, and for some time afterward, it was conceded that field might in course of time become a large producer of cotton hose, but with the contention that it never would be a factor in the silk division. And later, when spring needle equipment was crowding hard on latch needle machines in some sections, there were elements which were content to yield latch needle supremacy to the South, quite certain that hose of spring needle construction would continue to be a product of the older centers almost exclusively. All such prophecies have been so completely shattered that they lose eloquence when made to apply to other undertakings in the cotton belt of the world.

An impartial view, held by a northern manufacturer who is a close observer of the apparent trend, is that the

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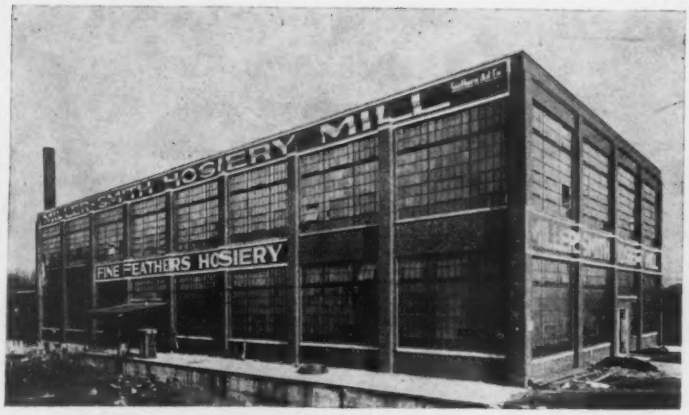


Full-Fashioned Plant of Miller-Smith Hosiery Mills, Chattanooga, Tenn.

This company started business in 1923 as jobbers, soon deciding to manufacture their own product. The Wardlaw Hosiery Mills in Chattanooga were purchased in 1924, and gradual additions made steadily, moving to the present quarters in Alton Park in 1925, adding more seamless machines. In 1926, the first eight full-fashioned machines were installed, and the company now has 20 in operation, taking up all available space. An addition to provide for expansion is planned.

full-fashioned industry may be assumed to be likely to make the same progress in the South as has the seamless or circular. Expansion may not be so rapid, because of the greater investment of capital required, but will show no less steadiness. The manufacturer in question draws a parallel with the transfer of much of the cotton industry from New England, and believes the ratio of increase in number of spindles and looms in a half dozen or more southern states will be pretty well maintained in the number of full-fashioned knitting machines in the states where the full-fashioned industry has been planted. He regards this as a logical outcome in the shifting of industrial centers, for one reason and another.

Why is the full-fashioned hosiery industry moving southward? Probably for the same reason that manufacturers in some northern sections have undertaken somewhat recently to improve plant operating conditions. It is no secret among either employers or employees that there is under way a well developed movement for more nearly equitable economic conditions, and that manufacturers will insist upon a better understanding of the rights and responsibilities of both interests. It is their contention that cost of production in full-fashioned hosiery mills is excessively high, compared with other industries, and that an adjustment of differences is essential to the preservation of their individual enterprises. In other words, unless they can come to terms with the trades union which dominates a large part of the industry, it would be wise to deunionize both the closed shops and open shops. It is represented as not a matter of wage scale so much as a plan of operation whereby mills might be free to adjust operating cost to conditions as they arise.

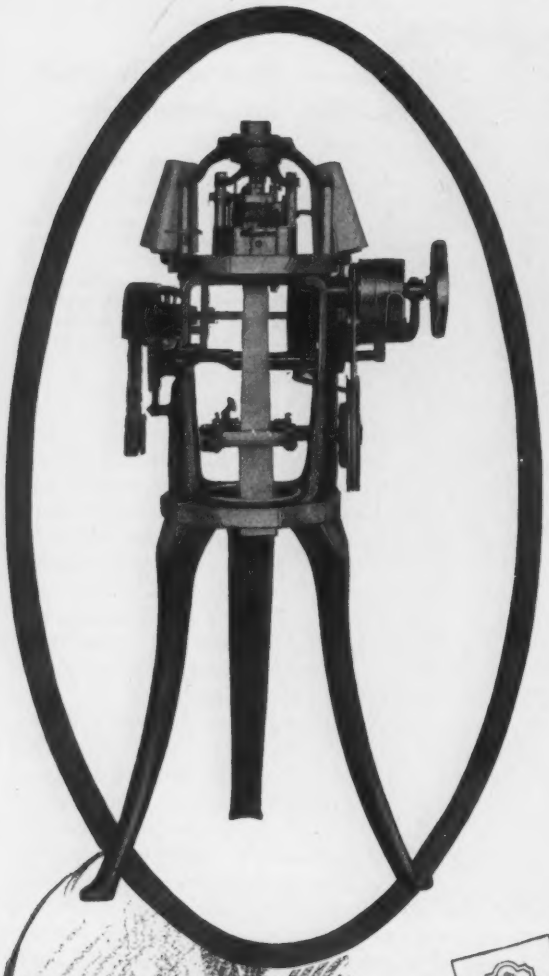
A recent survey of 47 mills showed a pretty nearly equal division as between open shops and unionized mills, and that the cost of knitting in the open shops was less than in the mills where union regulations are permitted to be enforced. But even in the open shops, it is a matter of experience, there is not entire freedom from union restrictions. As the matter stands, there is a disparity in schedules existing in neighboring establishments and, in sequence, an unevenness in competition in the finished goods markets, in which respect there is an advantage for the southern group. Where manufacturers have coddled the union or have continuously yielded to organized domination, is found the backbone of the present movement for an adjustment.

According to a very recent unofficial census there are in Philadelphia 79 full-fashioned hosiery establishments, including three mills of the Gotham Silk Hosiery Co. and two of Marshall Field & Co., and nine in territory suburban to the city. These latter are more nearly immune from union dictation than are their neighbors within the city. Others, who have taken up the cudgel in the struggle for an existence, prefer to fight their battle in their own bailiwick to removing their plants to a more congenial economic environment, but it is observed that intending investors in full-fashioned hosiery plants specify "not in Philadelphia or immediate surroundings."

According to spokesmen for both employers and employees, there is little difference in the wage rates in the North and South, from the standpoint of the dollar value. "Are southern knitters content with their rate of pay?" was asked of a manufacturer conversant with conditions in both sections. His reply was, "Yes, until organizers try to persuade them that they are not. The net return from their labor is little if any less than that of comparable employees elsewhere. If this were not the case, southern mills would be deserted and there would be so many applications for work in other fields that pay schedules established by organized knitters could not be maintained. I look for an all-around equalization on a basis dictated by supply and demand. Just now there is ample supply of mill help up here and, I understand, no excess in the South, where manufacturers have been fortunate indeed in being favored with conditions under which they are making wonderful strides in the building up of an industry comparatively new there, and providing employment under better conditions and at higher wages than are paid in most industries."

Several Pennsylvania manufacturers who, in connection with the movement inaugurated recently for an adjustment, sounded sentiment among their employees, say they found a large majority in favor of a peaceful disposition of what some feared might culminate in an industrial struggle, numbers expressing themselves as preferring steady employment at an adjusted rate of pay to half time employment at existing schedules. From this it is inferred some members of the union fear the organization would experience difficulty in maintaining an unbroken front in the event of a showdown. It is pointed out by manufacturers who have gone through one or more campaigns with organizers as their adversary that it is a simpler matter to scotch unionism at the start than undertake to dispose of it after it has gotten a strangle hold.

Keeping in mind developments which have run contrary to prophecy, and trading on history rather than sentiment,



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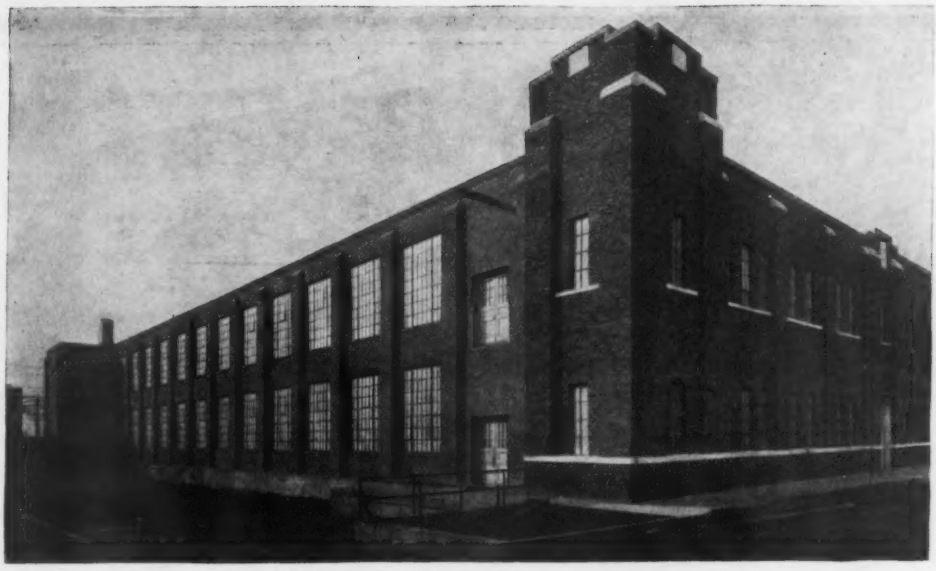

The full-fashioned plant of the Davenport Hosiery Mills at Chattanooga, Tenn. The home of "Humming Bird" hosiery.

it is within bounds to say the South will effect as complete mastery of the art of knitting full-fashioned hosiery as have other sections. Already sectional lines have been wiped out industrially, as in other particulars. But it would be a rash prediction to say that the South is destined to become the center of this industry in the United States. That, however, is well within the range of possibility, and possibilities will be the greater if the newer field of the industry profit by the experiences of some of the older ones. The South enjoys a competitive advantage in low cost of power by reason of an endowment of nature which it doubtless will not sacrifice by a surrender to allied but selfish interests, for following for a time a line of less resistance than that which often is encountered during controversy over a species of dual control. The way by which the southern industrial structure was built up is the way in which it can be perpetuated, and expanded with the maximum degree of safety. This applies with special force to the full-fashioned hosiery industry.

As illustrative of the trends in southern full-fashioned manufacture, and descriptive of what is actually being done, rather detailed stories of two of the recently established plants will be found in the following pages. In both cases, the companies had previously operated successful seamless hosiery plants at their location, the full-fashioned institutions being in the form of diversifying and expanding the mills' production.

Davenport Hosiery Mills Full-Fashioned Plant.

During 1926 the Davenport Hosiery Mills, Inc., Chattanooga, Tenn., placed in full operation a new mill producing full-fashioned hosiery exclusively. This company had for several years operated a large plant making the seamless line of Humming Bird pure silk hosiery, and since the existing buildings were occupied fully by this equipment, it was necessary to erect a new building, which is devoted to the full-fashioned work.

With this in view, a parcel of land at 11th and Clift Street, in Chattanooga, was purchased, close to the original location. Lockwood, Greene & Company, engineers, Atlanta, Ga., were employed to furnish plans and specifications, award contracts, and supervise all work during construction.

In order to take care of future demand for Humming Bird full-fashioned hosiery, a mill 94x228 feet, four stories high, was designed. The initial development consists of the construction of two stories with a small boiler house for a heating unit. The building is a modern fire-proof structure, of reinforced concrete with a rough texture face brick for all fronts. Reinforced concrete columns are spaced 14 x 31 feet, and the floor construction is of concrete beam type with clay tile and concrete ribbed slab, plastering the tile on the underside for a finished ceiling. On the concrete slab is laid 1 inch of tarred sand into which is bedded a 2-inch creosoted plank, then a 1-inch intermediate floor and a 1-inch maple top.

The first machinery installation consisted of a unit of 40 Ludwig type, 42-gauge machines, and the mill is now installing some 24-section, high speed, 45-gauge machines, Liebernecht type. The service weight hosiery is to be made on the 42-gauge, while the 45-gauge machines are used for the chiffon hosiery.

The plant is of modern mill construction, with automatic heat control, sprinkler system, and all modern conveniences. There is a rest room, a hospital unit with a trained nurse in attendance; and the wash rooms are tiled.

All machines are individually motor-driven by power purchased from the Tennessee Electric Power Company. Cooper Hewitt lights were installed throughout by the J. M. Clayton Company, Atlanta, who also installed all power and light wiring.

As has been the rule with all of the southern full-fashioned developments, no labor was imported, the mill training local help, which, they find, have the pride of real craftsmanship in their work.

The Humming Bird and Blue Crane hose manufactured by the company are sold only to the retail trade, and the mill has 35 salesmen traveling, with distributors in practically every city and town of consequence in the country. The Humming Bird hose are nationally advertised in leading consumer periodicals, such as the Ladies' Home Journal, Vogue, etc.

It is of interest to note that the Devenport organization, in addition to the full-fashioned and seamless plants, operating at night, also have their own silk throwing, wind-

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A section of the knitting room in the full-fashioned plant of the Davenport Hosiery Mills. Cooper Hewitt lamps are used throughout the mill.

ing and spinning plant, and the highest grades of raw silk are imported direct from Japan. A special method of spinning and twisting the silk thread, to give the hose a resistance to "catching" and "pulling," and for strengthening the thread, has been developed.

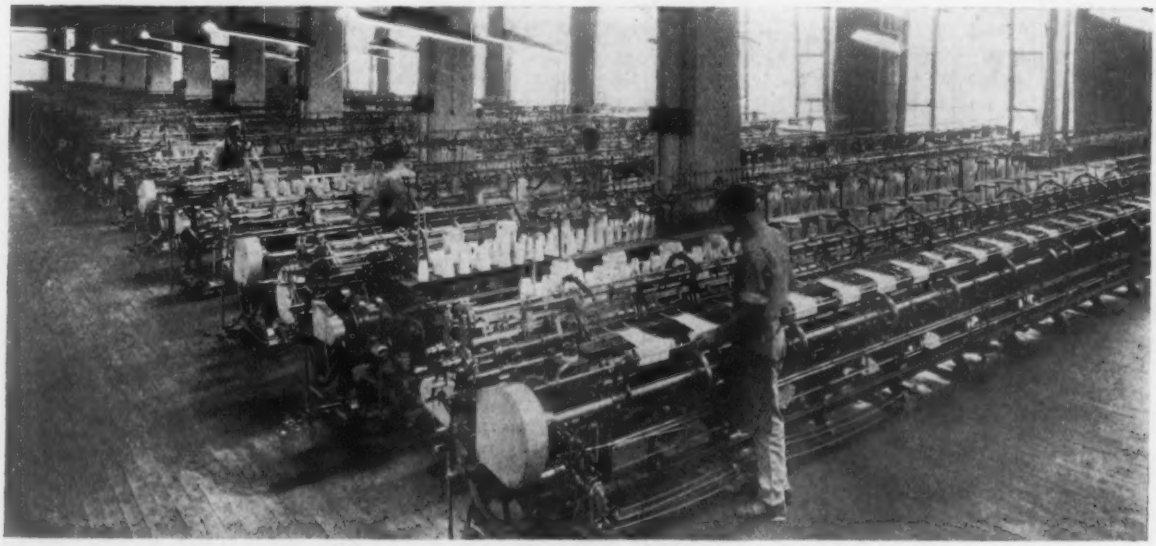
Gardiner-Warring Company, Florence, Ala.

The Gardiner-Warring Company, formerly of Amsterdam, N. Y., has just completed its new plant at Florence, Alabama, beginning the manufacture of men's cotton and silk knit underwear. The new plant has some 130 knitting machines and 230 sewing machines, and is equipped to do its own dyeing and bleaching. The site purchased by the company is located in East Florence, and comprises several acres on the Southern railroad.

The building program includes a main building, 84x134 feet, three stories. Paralleling the mill is the bleach house and boiler house, 34x111 feet, two stories. A storage warehouse for finished goods, 46x74 feet, is located between the main building and the railroad.

All of the buildings, with the exception of the warehouse, are of a slow burning, mill type of construction, steel beams, brick walls, and steel sash being used throughout. The main building and bleach house are connected on the second floor with an overhead passage.

All of the knitting machines are located on the third floor and the knitted product is delivered by a chute to



Another Group of Full-Fashioned Machines at the Davenport Hosiery Mills.

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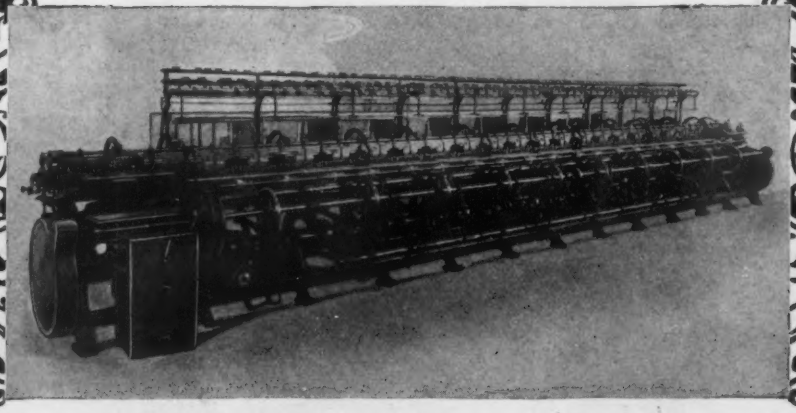

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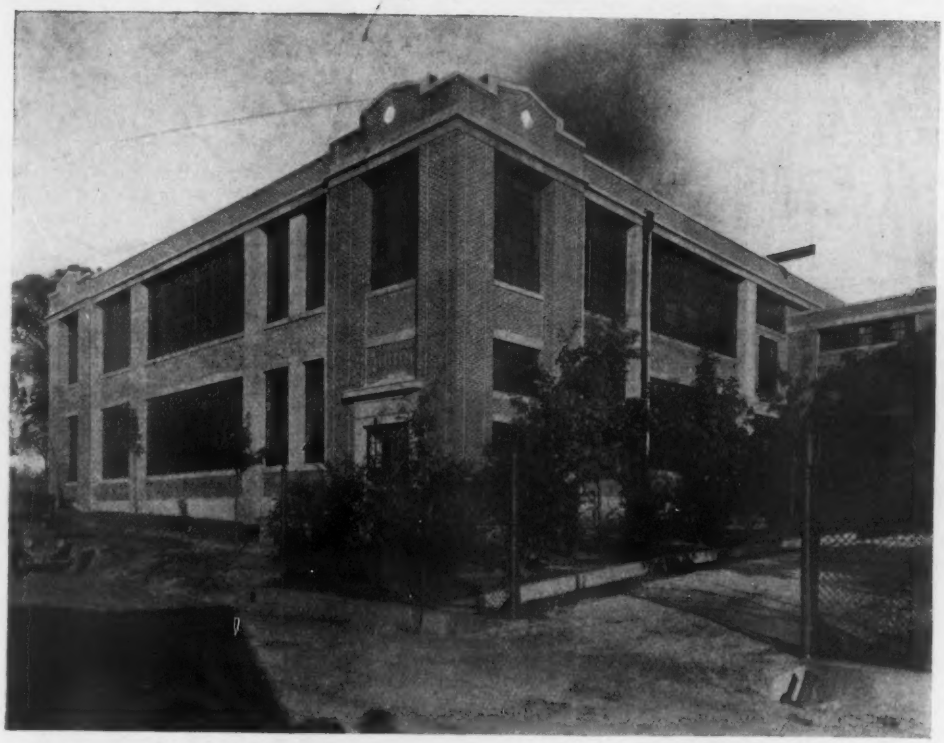
FULL-FASHIONED KNITTING MACHINE



Exterior view of the full-fashioned plant of the Magnet Knitting Mills, Clinton, Tenn. It is understood that this successful mill, which now operates 35 machines, has an extensive expansion program under consideration.

the bleach house. The goods are then passed through vertical dryers to the second floor and thence to the sewing room on the second floor of the main building. The press room, finishing and packing rooms are on the first floor.

The complete engineering work involved in putting this new plant into operation was handled by Robert & Company, Inc., architects and engineers, Atlanta, Ga.

Magnet Knitting Mills, Clinton, Tenn.

The Magnet Knitting Mills, Clinton, Tenn., have been manufacturing seamless silk and silk-and-rayon hosiery since 1905. They also have a branch seamless half-hose plant at Coal Creek, Tenn., which is near Clinton.

Within recent months they have begun the manufacture of full-fashioned hose for women, in a new plant built for the purpose, adjoining the existing seamless mill at Clinton.

The full-fashioned plant was designed by J. E. Sirrine & Co., Greenville, S. C. It is 250x100 feet, two stories, modern in every detail. The company operates 35 42-gauge machines, manufactured by the Textile Machine Works, and have a daily production of 350 dozen full-fashioned, with a 2,500-dozen per day production of seamless goods. They sell the jobbing trade exclusively; J. P. Voorhees, 49 Leonard St., New York City, is the selling agent.

It is understood that the expansion program in the full-fashioned department for the next two years will include the installation of 75 additional 42- and 45-gauge machines. Garnett Andrews, of Chattanooga, Tenn., is president; C. S. Kincaid, Clinton, is vice-president and treasurer.

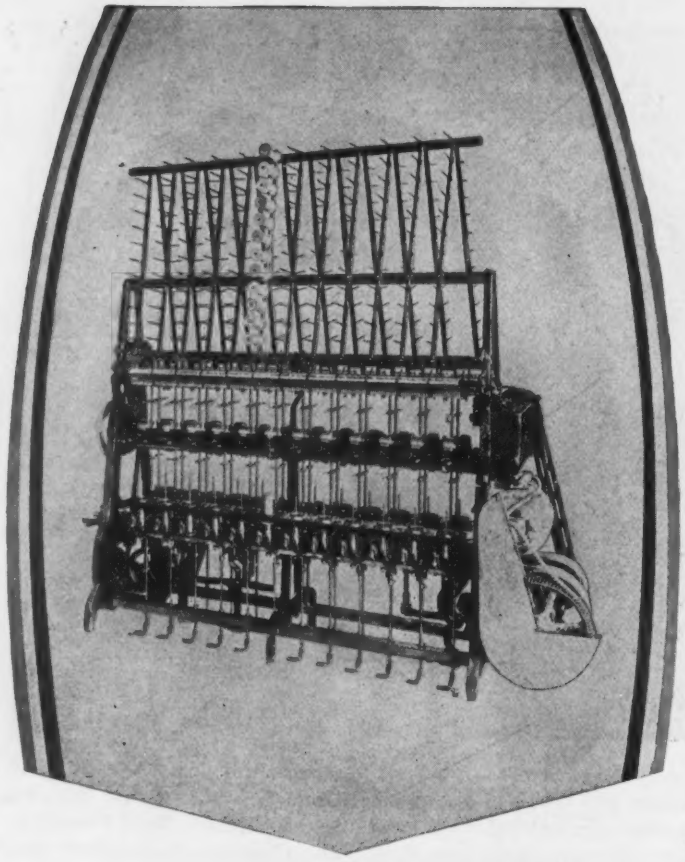
Other New Knitting Mills and Additions.

The knitting industry has experienced a healthful growth in the number of new plants established. Considering first the full-fashioned division, this phase has seen the most impressive development. Of the list of 21 mills shown on the first editorial page of this section, six—Wiscassett Mills Co., Albemarle, N. C.; Hoover Hosiery Co., Concord, N. C.; Golden Belt Mfg. Co., Durham, N. C.; Durham Hosiery Mills, Durham, N. C.; Charlotte Knitting Co., Charlotte, N. C.; Nebel Knitting Co., Charlotte, N. C.—were operating prior to eighteen months or so ago, the remaining 15 all having been started or organized within that period.

So far as underwear is concerned, the new mills of the Gloria Underwear Mills, at Eufaula, Ala., High Rock Knitting Mills, Bristol, Va., and the Gardiner-Warring Co., at Florence, Ala., represent the new additions to the industry.

In the seamless hosiery end—half-hose, ladies', misses' and infants'—a surprisingly large number of new mills have been formed. These include the following, representing either new companies or new plants of existing organizations:

W. B. Davis & Sons, Fort Payne, Ala.; Cranford Hosiery Mills, Asheboro, N. C.; Unique Knitting Mills, Acworth, Ga.; Tampa Knitting Mills, Tampa, Florida; Flint Hosiery Co., Burlington, N. C.; Perfection Hosiery Co., Burlington, N. C.; Carolina Silk Products Co., Greensboro, N. C.; Lawler Hosiery Mills, Carrollton, Ga.; McKinney Hosiery Co., Henderson, N. C.; Wear Knitting Co., Tryon, N. C.; Person Knitting Co., Roxboro, N. C.; Houston Knitting Mills, Houston, Texas; Paramount Knitting Mills, Houston, Texas; Bassett Knitting Mills, Bassett, Va.; Artus Knitting Mills, Bristol, Va.; Inspiration Hosiery Mills, Wytheville, Va.; Davis & Allcott, Gadsden, Ala.; Georgia Knitting Mills, Barnesville, Ga.; Rome Hosiery Mills, Rome, Ga.; Carolina Hosiery Co., Burlington, N. C.; Cavalier Hosiery Mills, Narrows, Va.; Pen-Co Hosiery Mills, Burlington, N. C.; S. S. Miller Hosiery Mills, Burlington, N. C.; East End Hosiery Co., Burlington, N. C.; Grace Hosiery Mills, Burlington, N. C.; D. & W. Hosiery Co., Meridian, Miss.; Garrow Hosiery Co., Morganton, N. C.; A-One Hosiery Co., Chattanooga, Tenn. Hanes



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Hosiery Mills Co., Winston-Salem, N. C., moved into a new plant. Virginia Dare Knitting Mills, Elizabeth City, N. C.; Morristown Knitting Mills, Morristown, Tenn.; Carmichael Hosiery Mills, MecDonough, Ga.; Dobson-Miller Corp., Pulaski, Va.; Wyrick Hosiery Mills, Mebane, N. C.; Emory & Seagroves Hosiery Mills, Durham, N. C.; S. S. Hosiery Mills, Rural Retreat, Va.; Willis Hosiery Mills, High Point, N. C.; Welborn Knitting Mills, Lexington, N. C.

The knitting mills making substantial manufacturing additions included: Morristown Knitting Mills, Morristown, Tenn.; Knoxville Knitting Mills Co., Knoxville, Tenn.; Maurice Mills, Thomasville, N. C.; Pannill Knitting Mill, Martinsville, Va.; 20th Century Rayon Co., Petersburg, Va.; Paul Knitting Mills, Radford, Va.; Erwin Mfg. Co., Huntsville, Ala.; Carroll Mills, Carrollton, Ga.; Perkins Hosiery Mills, Columbus, Ga.; Villa Rica Hosiery Mills, Villa Rica, Ga.; Wiscassett Mills Co., Albemarle, N. C.; Graham Hosiery Mills, Burlington, N. C.; Standard Hosiery Mills, Burlington, N. C.; Hudson Silk Hosiery Co., Charlotte, N. C.; Vance Knitting Mills, Kernersville, N. C.; Mt. Airy Knitting Mills, Mt. Airy, N. C.; Wilkes Hosiery Mills, Wilkesboro, N. C.; Janet Hosiery Mills, Shelby, N. C.; McDonald & Heathcote, Thomasville, N. C.; P. H. Hanes Knitting Co., Winston-Salem, N. C.; Anderson Knitting Mills, Anderson, S. C.; Champion Knitting Mills, Chattanooga, Tenn.; Nick-a-Jack Hosiery Mills, Chattanooga, Tenn.; Asheboro Hosiery Mills, Asheboro, N. C.; Washington Hosiery Mills, Nashville, Tenn.; Debonair Hosiery Mills, Cleveland, Tenn.; Louise Knitting Mills, Durham, N. C.

Sewing and Seaming of Knit Goods

Cutting Department Costs Through the Use of the Correct Tension and Take-up—Watching for Small Items Pays

BY WILLIAM DAVIS, M. A.

The maker of knit goods has to give very careful attention to the cost of his products and a great deal of mystery has been made of secret systems of cost accounting which are calculated to work wonders in the industry and conjure up a profit where there might be a loss.

In cost accounting there is the bookkeeping side where the system has to be on the most approved lines of cost accounting and where the correct allocation of overhead charges is a primary desideratum. In this connection it is advisable to test all the machines in the equipment from time to time and ascertain which are being run at decreasing efficiency. There are, in many concerns, a number of passengers being carried, not only in staff but also in the equipment, and scrutiny will reveal machines which show an actual loss in working and for which the most efficient members of the equipment have to pay from their earnings.

It is never very difficult to set down on a cost chart the cost due to regular piece rate or time wages connected with the routine of the article being manufactured, but in all cost sheets there are various items included under a more or less lucky percentage. In every factory producing knitted goods, a large expenditure is incurred each year on the seaming and joining up of the garments, and the materials employed in this operation are often allowed for in costing systems in a rather loose manner. A careful technical analysis is the only way of scrutinizing this item satisfactorily and the regular cost accountant very rarely has the practical insight into the technical operations involved to be able to give a comprehensive and accurate survey.

Such a survey has been undertaken as the result of a large number of experiments extending over a long period and it may be interesting to set down some of the more salient deductions. It is quite certain that unless these matters are definitely investigated the manufacturer can have no idea of the great leakage of expense which is possible in this branch of the industry. Sewing and seaming machines have such a wide variation possible to them in the matter of take-up of thread that it is possible for greatly increased expenses of management to be incurred in quite a casual manner. In regard to this eating up of thread it has been found that a small alteration in the tension may cause an increased expense of such an amount that it figures as a very nice item to have in hand when competitive prices are being quoted.

The length of thread consumed by the different kinds of seams can be measured in various ways, perhaps one of the best is to mark off a given length of thread on the individual threads constituting the seam and after a yard of seaming note the amount of thread of each class which has been absorbed in the operation. Thus, if three yards of thread are required to produce stitching one yard in length, the take-up figure is stated to be three. By altering the tension of the machine it is possible to obtain a greater or less take-up according to requirements, the chief one being that of gauge of fabric. If the seaming threads have to reach through a 20 gauge material it will require more thread than it would to penetrate a fine fabric of 40 gauge. But even in the same gauge there is an appreciable variation of tension possible and indeed desirable in some cases. This increased length of thread in relation to the length of fabric seamed is needed to give added elasticity or stretch to the join, but it should be known that this variation makes an appreciable difference to the cost and it often happens that the larger take-up of thread is inserted where it is not at all required and where the smaller ration would be quite adequate.

But there is a further point of importance and that is the comparison as regards costs of alternative systems of joining goods and of when alternative systems are available, it is important to be able to figure out relative costs accurately and ascertain the difference in cost per dozen which is involved. Of late there has been a disposition among manufacturers to try new methods of seaming and they have found that it is not desirable to be too rigid in adherence to methods which have been accepted for all purposes. It often happens that a simpler and less expensive system of seaming is quite suitable for a particular purpose.

To bear out those observations a number of experiments

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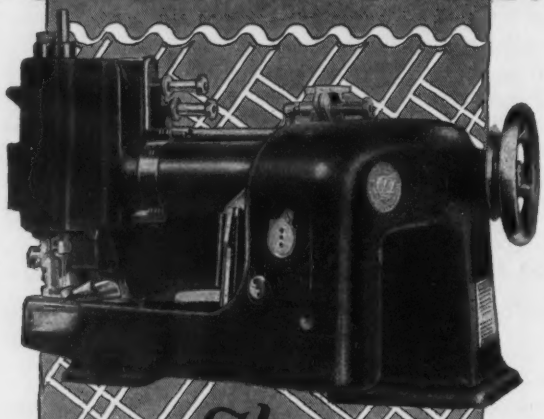

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have been conducted on a range of sewing and seaming machines with yarns which are suitable counts for general average gauges, the usual weight of goods being between 20 and 30 gauge Cotton's patent system. The amount of thread absorbed depends not only on the gauge but also on the number of stitches per inch inserted in the stitching, for coarse goods we may have about 12 stitches per inch, but for fine goods these may be increased up to nearly 30 stitches per inch. Then on the same fabric one can be given a variation of tension which is quite considerable.

Full-fashioned hosiery is generally seamed on what is known as the cup seaming machine where one thread issues through a needle and the second thread through the eye of a looper. For an average gauge it requires about ten yards of seaming thread to produce one yard of seam and in general the quantities of the two materials are fairly evenly balanced. At the same time one can have examples where the take-up of thread is in the region of eight yards per seamed yard and you may also have a take-up nearer twelve yards per yard of seam.

Example 1. Investigation shows that two varieties of seam are being used in the cup seaming machine given herewith in tests *A* and *B*. Find the cost per 1000 yards of seaming, taking the needle thread as 2/42s worsted counts at $1.56 per pound and the looper thread as 2/36s worsted counts at $1.15 per pound.

	Test A	Test B	
Needle thread ..	5.28	6.3	— Take-up to produce
Looper thread..	5.00	5.5	— one yard of seam.
Totals	10.28	11.8	

The unit of 1000 yards of seaming is convenient as a means of avoiding fractions. In test *A* the needle thread has a take-up of 5.28 which for 1000 yards of seam = 5280 yards of thread consumed. The yarn is 2/42s worsted counts which is taken as 21s single so that 21 × 560 = yards per pound which costs $1.56. By proportion one can find the weight of this length of seaming thread, given that 21 × 560 = yards in one pound and at the same time if this be multiplied into the cost per pound, $1.56, it will give the cost.

Test A. $\frac{5280 \times 156 \text{ (cents)}}{21 \times 560}$ = 70 cents per 1000 yards seam for the needle thread;

$\frac{5000 \times 115}{18 \times 560}$ = 57 cents per 1000 yards seam for the looper thread.

.70 + .57 = $1.27 total per 1000 yards of seam.

Test B. $\frac{6300 \times 156}{21 \times 560}$ = 83.5 cents per 1000 yards of seam.

$\frac{5500 \times 115}{18 \times 560}$ = 62.7 cents per 1000 yards of seam.

Total $1.462 cents per 1000 yards of seam.

$1.462 — $1.27 = .192 cents per 1000 yards of seaming due to this small difference in take-up of the seaming thread in those goods. It does not seem much, but if this leakage is taking place throughout a large factory it soon amounts to a considerable sum and it is one of those economies which can often be made without in any way interfering with the quality of the product.

Another very common member found in the equipment is that of the chain stitch machine which is employed for a limited number of operations in sewing and seaming. It produces its seam from a single cotton thread which is supplied from the needle only and which is chained into itself by a looper which works underneath the fabric. It is a structure which lacks stability in some ways and for this reason is seldom employed by itself. It is, however, very useful for many purposes of embroidery and particularly in conjunction with the two- or three-thread overlock seam when it is required to flatten these seams by felling, that is, the raised portion is turned over and felled to the main body of the material by means of the chain stitch. It is often considered along with the two-thread overlock stitch as an alternative for the 9-thread seam and hence it is a useful system to ascertain the cost of.

A number of tests made on this style of seam show that the take-up figure varied between 3.3 to 4.5 for quite a small alteration in set of the stitching. The test is made with the usual sewing cotton counts of 60/3 = 20s single so that 20 × 840 = yards per pound. The cost per pound of this is given as $2.00.

Example 2. Test *A* is made showing a take-up of 3.3 while test *B* gives a take-up of 4.5, in each case the yarn is 60/3 cotton counts and the price is $2.00 per pound. The following calculation is made on the basis of 1000 yards of seamed material.

Test A. $\frac{3300 \times 200}{20 \times 840}$ = 39.28 cents per 1000 yards of seam.

Test B. $\frac{4500 \times 200}{20 \times 840}$ = 53.57 cents per 1000 yards of seam.

53.57 — 39.28 = 13.29 cents difference between one take-up and another in a common range of sets.

The lockstitch machine is a standard type in the equipment of the knit goods manufacturer and the take-up in this variety was found to vary as follows: 7 stitches per inch:

needle thread = 1.133
shuttle thread = 1.05

total = 2.183

For 24 stitches per inch the take-up increased in amount as follows: needle thread = 1.15
shuttle thread = 1.3

total = 2.45

Taking the difference between 2.45 and 2.183 this gives .267 and on a basis of 2.183 this works out as 12.2 per cent increase in cost to obtain the higher take-up shown.

In noticing this small take-up of thread compared with the other styles of seaming enumerated, the temptation is to suppose that this is a useful system. It is extremely useful for attaching items in knitted garments, but lacks elasticity and is comparatively little used for the great purposes of edge joining in the industry.

In a seam of this kind, however it sometimes happens that it is necessary to reduce the costs and this can be done on the shuttle thread more easily than on the needle thread, also one has to take account of such things as waxed yarns which are sometimes necessary for smooth working of the thread in the needle and this operation of waxing costs the manufacturer several cents per pound more.

Example 3. Compare the costs of the two following

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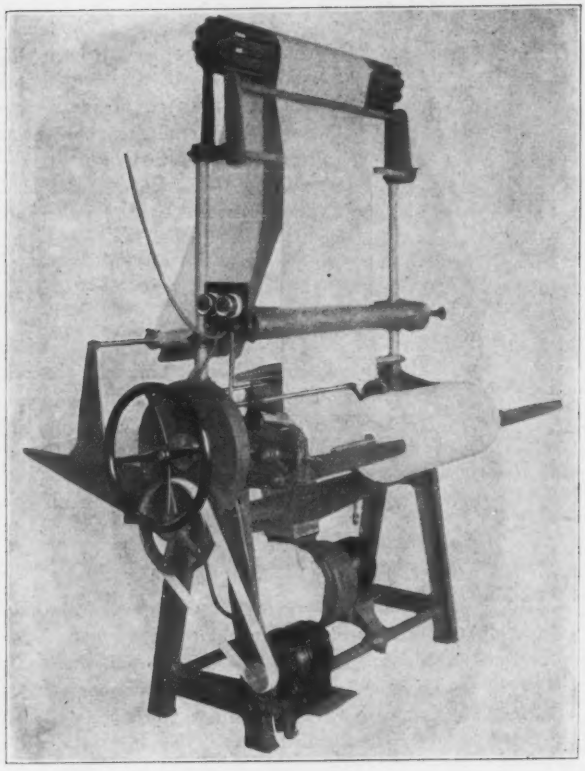

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alternative processes where the take-up figures and cost of the thread vary as follows in tests *A* and *B*.

	Needle thread	*Shuttle thread*
Test A	1.15 take-up	1.15 = 2.3 total
Test B	1.15 take-up	1.30 = 2.45 total

All the threads are $2.00 per pound except in test *B* when the cost of shuttle thread is reduced to $1.75. In all cases the standard 60/3 cotton is employed.

Test A. $\frac{1150 \times 200}{20 \times 840}$ = 13.7 for needle and 13.7 for looper.

Test B. $\frac{1150 \times 200}{20 \times 840}$ = 13.7 for needle.

$\frac{1300 \times 175}{20 \times 840}$ = 13.54 for shuttle.

In this case the extra take-up of the shuttle has been almost equalized by the reduction in the price of the cotton used. In the same way one can ascertain the difference in cost if the take-up remains the same when it will be possible to save something on the cost of the shuttle thread as this variety remains on the back of the fabric and the good quality yarn will still appear on the face.

Example 4. The two-thread overlock stitch is one of the bulwarks of the knitting industry and herewith are given the results of two tests *A* and *B* with different take-up figures. The needle threads are given in 2/40s worsted counts at $1.50 per pound, while the looper thread is taken as slightly thicker, 2/32s worsted counts, at $1.25 per pound.

	Test A	*Test B*
Needle thread.....	8.4	10.25
Looper thread.....	6.02	7.9
Take-up totals.....	14.42	18.15

Test A. $\frac{8400 \times 150}{20 \times 560}$ = 112.5 cents per 1000 yards of seam for the needle thread.

$\frac{6020 \times 125}{16 \times 560}$ = 84 cents per 1000 yards of seam for the looper thread.

Total = 196.5 cents per 1000 yards seam.

Test B. $\frac{10250 \times 1500}{20 \times 560}$ = 137.27 cents for the needle.

$\frac{7900 \times 125}{16 \times 560}$ = 110.2 cents for the looper.

Total = 247.47 cents per 1000 yards of seam.

The increase in cost per 1000 yards of seam by the second system is 51 cents per 1000 yards of seam which is a very considerable item in the costing of such goods, and this variation in take-up may well be found in goods of about the same gauge. It shows the importance of having the tensions of the seaming and sewing machines tested periodically in the same way that manufacturers of silk hosiery have had to put on inspectors of production whose function it is to test hosiery by measuring courses per inch and pointing out discrepancies in length which occur when those courses are not strictly adhered to.

None of the foregoing calculations take account of the item of waste which is made in the operations and there is a great difference in operators as to the amount of seaming waste incurred. A common point is the throw-over when they are finishing one seam and severing the seaming thread preparatory to starting another. In some machines the worker can cut very near the edge while others require an appreciable length in excess to allow the seam to be properly trimmed.

The three-thread overlock seam is a natural sequence to the two-thread and the tests have shown that contrary to general expectations, this type of seam does not require more yarn; in some cases even less than the two-thread overlock seam. It is a matter on which one cannot give at the moment a dogmatic opinion, but sufficient has been done to show that the relation of the two-thread seam to the three-thread seam should be more carefully examined as it will be found that the usual ideas regarding the three-thread seam are erroneous. It is indeed not a more costly seam to produce as regards materials absorbed than the two-thread.

Example 5.

	Test A	*Test B*
Looper 1..	4.8	5.1 = 2/36s worsted at $1.25
Looper 2..	3.7	4.8 = 2/36s worsted at $1.25
Needle....	1.8	2.3 = 2/50s worsted at $1.60
Totals =	10.3	12.2

Test A. Looper 1

$\frac{4800 \times 125}{18 \times 560}$ = 59.5 cents.

Looper 2

$\frac{3700 \times 125}{18 \times 560}$ = 45.8 cents.

Needle

$\frac{1800 \times 160}{25 \times 560}$ = 20.5 cents.

Total = 125.8 cents per 1000 yards of seam.

Test B. Looper 1.

$\frac{5100 \times 125}{18 \times 560}$ = 63.2 cents.

Looper 2.

$\frac{4800 \times 125}{18 \times 560}$ = 59.5 cents.

Needle

$\frac{2300 \times 160}{25 \times 560}$ = 26.3 cents.

Total = 149 cents.

Comparing tests *A* and *B* there is an increase of 23.2 cents per 1000 yards of seaming by the augmented take-up shown in test *B* and this is a useful little item to conjure with in dealing with the expenses of a department, particularly if things are keenly cut and the lower figure can be offered quite as well as the higher one, no difference in work being observable. In fact it may be that the smaller take-up may mean that goods are more neatly finished and smarter in appearance.

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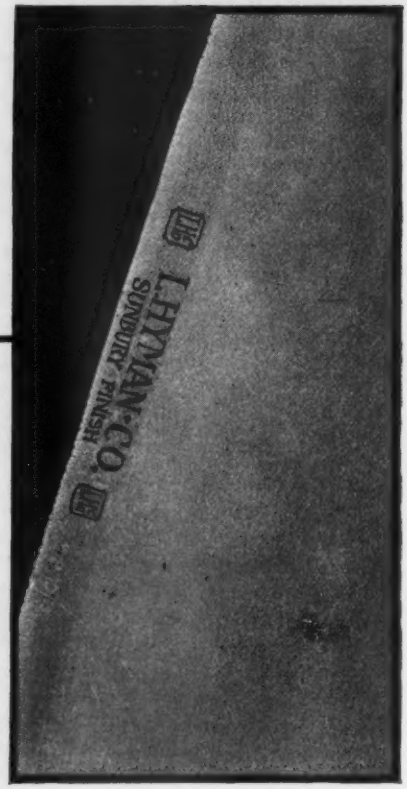

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The A B C of Dyeing

Uneven Dyeing and Its Causes—Eternal Vigilance the Price of Continuous Good Work

BY NOEL D. WHITE.

PART FIVE.

When dyeing is carried on with proper care, suitable dyestuffs, and every phase of the operation watched diligently, the dyer can be reasonably certain of good results.

However, a certain amount of human nature enters in the process that renders continuous and perfect work not always on the order of the day. Sometimes a lot has been spoiled by not watching the temperature of the finishing bath; the worker has forgotten to watch the steam and instead of lukewarm, his finishing is conducted in a hot bath. Some color has been stripped from the cotton in this hot bath, and the result is a lot with a bad match between cotton and silk. Of course, every lot should be matched to sample again out of the last water and before taking out of the machine, but after a period of good work everyone is liable to get careless. When lot after lot needs no retouching in the last water, the dyer comes to the conclusion that this last matching is a waste of time and then things like that happen. Eternal vigilance is the price of continuous good work.

In shaking out and dressing the goods while bagging a lot to dye, the workers get in a hurry and let the hosiery get in the bag tangled up in big knots; or, instead of taking a bag at a time and dividing the goods in it properly and evenly while loading a lot in the machine, they grab two or three bags at once and throw them in any old way, with the result that some of the goods are crowded tight in a corner of the bag, and never have a chance to dye evenly; or, the worker has entered his salt ahead of time, forgetting, or miscalculating, or just to hustle the work to finish early for no reason at all.

Any of these things may cause unevenness to the cotton and can be avoided, but when they occur and can be detected before the lot is finished, sometimes an extra boiling with some equalizing chemical like Tetracarnit will improve the lot. Or, maybe the acid was entered in the bath not properly diluted, or in a bath yet too hot, causing the color to rush on the silk in spots. The best temperature at which to enter the acid without danger is 150 degress F., and it should be put in slowly, with the drum of the machine rotating towards the worker. In a case of bad work from this cause, the damage can be remedied, in most cases, by adding one per cent of phosphate of soda, and boiling once more.

However, boiling too many times is not going to help the general appearance of the goods when finished. The silk is liable to get lousy, chafed, or fussy. The cotton, also, is not improved by prolonged boiling, and it should be avoided except in cases where, in the dyer's judgment, an extra boiling is all that will be needed to make a perfect job.

At times many additions of dyestuffs are found necessary to bring up the shade to a good match. Every addition necessitates a longer period of working in the machine. The longer the lot is worked, the more the goods become entangled in the bag; a look in one of them will convince the dyer that no good results can come from working a lot any further with the goods in such condition. The best way will be, in such a case, to rinse the lot in cold water, take it out, whiz it in the extractor and dress it again to straighten it out and disentangle it, then return it to the machine and proceed with the matching, adding whatever dyestuffs are needed. We seldom take a lot out to straighten out when it takes too long a time to bring the cotton to shade, but we will not hesitate to do it when we are matching the silk. Silk being the leg of the stocking, gets twisted, strangled and knotted one into another, and we are quite satisfied that it is easier, safer, and the quicker way for good results, to remove it, as explained, dress it and then finish the dyeing with the lot in good condition to be dyed evenly.

In some cases I have found a lot uneven in the cotton where it was evident that a different grade of cotton was used; or the mercerizing was faulty, or cotton bought from different manufacturers was put in the same stockings. Against such cases of faulty dyeing the dyer has no remedy, but it can be minimized to a large extent by using sulphonated oil in the bath. That retards the absorption of dyestuff by the cotton, and helps to equalize the shade.

Uneven dyeing may be the result of using unsuitable dyestuff. That emphasizes the fact that the dyer should learn as much as possible about the properties of the dyestuffs he intends to use in his work. For best results a dyer should select, for a given shade, dyes that have the least contrast with one another. For example: to dye a grey, he should select a good grey dye, the nearest to the sample, make that the foundation of his shade, and work around that with orange or yellow, or red, or all of them in the needed proportion; or, if he has a tan, he should select a good brown nearest to the shade he has to produce, and shade it with grey, yellow, or orange, etc. An illustration will bring out the point I have in mind:

Some time ago a friend of mine, a yarn manufacturer, came to see me with some stockings made from some of his yarn; they were dyed a light tan. He said the knitter had sent those stockings to him to show him that his yarn was mercerized unevenly and would not take an even dye. On examining them, I noticed some red streaks a few inches long and about one-eighth of an inch wide, running with the knitting across the leg, but showing plainly that it was badly dyed. There was in that dyeing a color that evidently did not equalize well, but what struck me most was why that red should be there. It was a purplish red that had absolutely no business in that shade. I told him that whoever made that mixture of dyes for such a shade had very little knowledge of dyestuff, or knew very few of them. He asked if I would dye a bunch of stockings for him, the same shade and with the same yarn, to see if the yarn was faulty in any way. I said I would, and the next day I got the stockings.

For 5 pounds of stockings I used ½ ounce of Erie

Catechine 3 G, and 1 gram of Erie Fast Orange A—and the result was very gratifying to my friend, and I am sure his customer learned something by it.

Another instance that will show how badly a mixture of dyes can be made I will illustrate by the following experience I had some years ago, just after the conclusion of the war and soon after some of our dyestuff makers started manufacturing dyestuffs. For a shade of grey we were dyeing on silk used for decorating woolen suiting, we were using Malta Grey. That product had gone out of the market, and we were looking for something to take its place. A dyestuff salesman came in one day, and the manager asked him if he had anything to take the place of Malta Grey. He told him also that silk dyed with Malta Grey, or its equivalent, had to stand scouring and fulling. The salesman assured him that he had, and would send a sample of the product and a dyed silk sample. In due time both the product and the dyed sample arrived with a formula for dyeing 100 pounds. I was given the whole, with instructions to test the dyed silk for fastness to scouring, and to make a test dyeing my own way and report the results.

I never made the dyeing test. I scoured the silk they had dyed, and got out a dirty green; then I blew some of the dyestuff on a wet piece of white paper, and the result was a rainbow plus. I asked the manager to write the firm for a description of the dyestuffs entering that "would be" Malta Grey, and when the answer came back it stated that it was: Acid Green, Wool Orange and several others I have forgotten at this late date, but I can never forget the two I mentioned. And that was supposed to be a dyestuff to stand scouring and fulling.

In scouring, the Orange was the first to start running and left the Green and part of the rest of the combination entering that mixture, and the result was something we could not use at all. What that dealer should have used was a direct black shaded with that green to match the shade produced by Malta Grey, and it would have been found satisfactory. I know they had a good black for that purpose even then, although I did not know it at that time. That is the reason we now have at our disposal so many dyestuffs to select from. Every dyestuff maker strives to come as near the shades in fashion as it is possible to make them, so why not take advantage of it?

There was a time when I could run my dyehouse with ten or eleven dyestuffs in my drug-room. With them I could produce all the shades needed; some two hundred of them, but that was a good many years ago. With nothing but them today I could not hold my job for very long. I have here a large collection of dyed samples to select from, but would not hesitate a minute to add to it if I found a color that looked promising, and we are continually on the lookout for new colors that come in the market, for we want to keep abreast of the times.

With a good dye to start on as a foundation for any shade, some little additions, either for the cotton, silk or the artificial silk to make a good match is all that is necessary, and as I said in a previous article, the fewer the dyes entering a combination the better the results, and the easier to check up. Providing the color used for the foundation is a good level working dye, the dyer may be reasonably sure his hosiery will come out dyed evenly lot after lot. The chances of having uneven and bad dyeing are reduced to a minimum.

For blacks, especially developed blacks, my advice is to select a color that dyes black right in the dyeing bath. There are some good developed blacks which dye dark blue, and are developed to a jet black with Resorcine, or Meta Toluylene or Meta Phenilene Diamines, with or without Beta Napthol. While these blacks are good for many purposes, for dyeing hosiery they are not the best. Keeping in mind that hosiery is dyed in nets containing three or four dozen stockings each, there is a chance that some of the goods may be bundled up too tightly for the developer to reach them before it is completely exhausted, and the result will be many streaky stockings in the lot that have to be re-dyed.

Now with a black dyeing developed dye there is no such chance because the stockings are already black, and the developer only enhances the bloom and fastness of the black. There are such developed blacks on the market. It is up to the dyer to find them.

Another cause of uneven dyeing is the result of making additions of dyestuff to the bath when the temperature of the bath is too high. There are some colors that can be added to the bath even at the boil. They are few; I know only two of them—Neutral Red W H and Neutral Brown A N. Most dyes will rush on the goods in spots when entered too hot, and the proper way to add colors is in a bath not higher than 150 degrees F., if to shade the silk, and in a new bath if to shade the cotton.

There are other causes of uneven dyeing on hosiery as in dyeing other material, but what I have enumerated above are the most common and current, the ones I am more familiar with and try to eliminate more or less successfully.

The causes of spots and other troubles encountered in dyeing will be discussed in the next number.

Conditioner for Rayon Yarn.

J. A. Firsching, 614 Broad St., Utica, N. Y., is marketing the Firsching rayon yarn conditioner, for use in knitting mills. The object of the conditioner is to so prepare the yarn after it is wound on the bobbin that it can be knitted without the necessity of having it treated with oil prior to the winding. According to the manufacturers, the conditioner has demonstrated in mill use that the treatment of yarn with oil for rayon fabric work is unnecessary. It is pointed out that the device makes it necessary only to scour the fabric fifteen minutes to remove the hand dirt, where, it is stated, three times that period is required to remove oil properly; also, it is brought out, the use of oil in the scouring and half the soap is eliminated.

Cleveland Office Moved.

The Cutler-Hammer Mfg. Company announce that their Cleveland, Ohio, office has been moved from the Guardian Trust Building to the Guarantee Title Building, Suite 1905. The new office has approximately three times the space of the old with increased facilities for the large and growing business.

Oxwelded Roof Trusses.

This is the title of a book prepared by H. H. Moss, of the Linde Air Products Company, 30 East 42nd St., New York City, which represents a study of insert plate joints in Fink type roof trusses. It is being distributed by the company.

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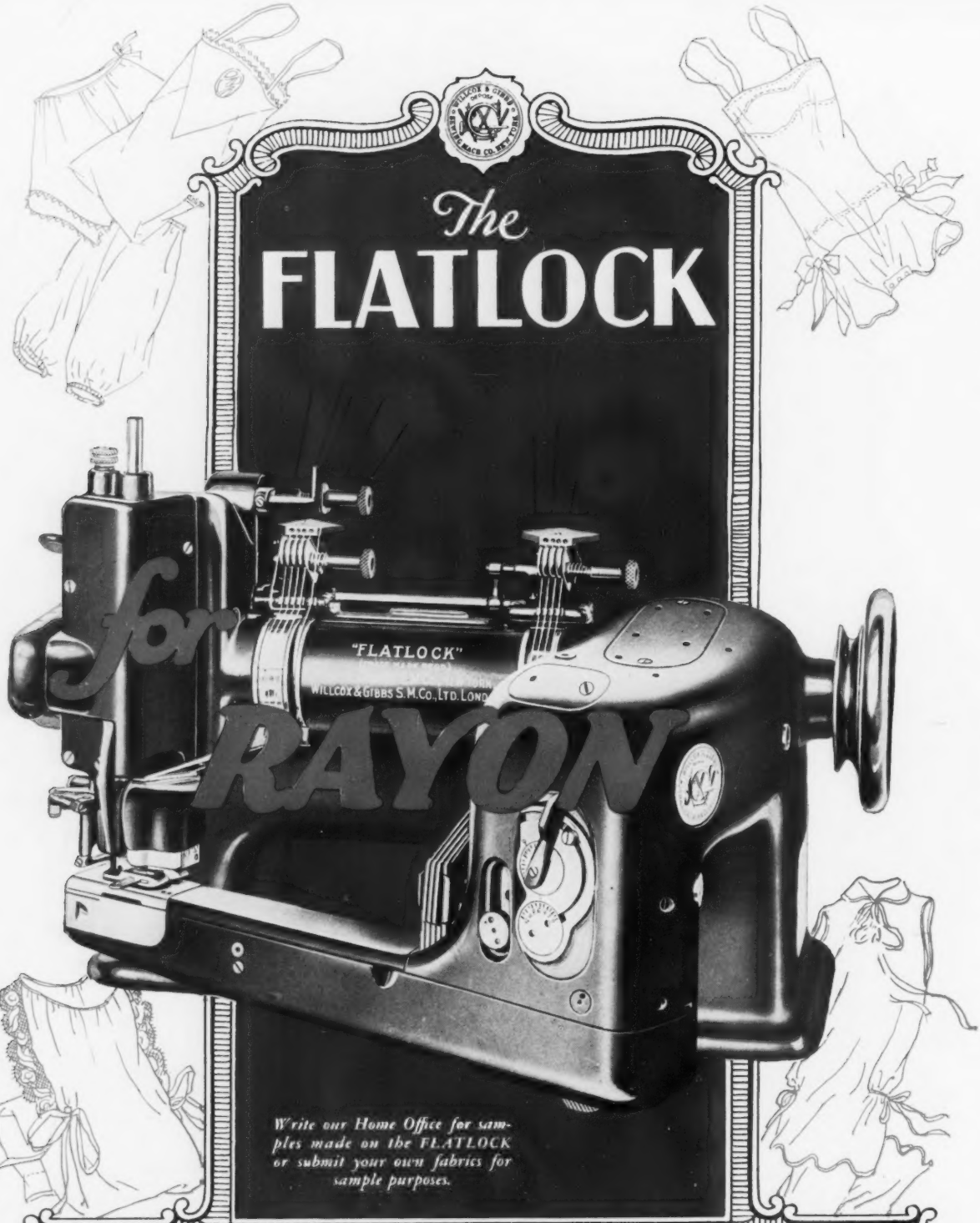

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We invite our readers to make use of this department for the discussion of any and all problems arising in connection with the knitting mill from the office to the packng and shipping departments. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. All questions will be answered as promptly as possible. The names and addresses of the contributors must be given, but will be held in confidence and a pen name substituted when printed. All accepted contributions other than questions will be paid for after publication. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Wishes to Strip a Developed Black from Silk Hosiery.

EDITOR COTTON:

We shall appreciate seeing in "Knitting Kinks" some information from various readers as to how to strip a developed black from silk hosiery similar to the sample being sent. I should be very pleased to have some readers give their methods for doing this work in their own plants.

W. G. (CALIFORNIA).

Weighing and Calculating Dyestuffs.

EDITOR COTTON:

I have just read in the September issue of COTTON a letter from a contributor signing himself "T. O. (N. C.)," who says that he has read my humble contribution entitled "The A B C of Dyeing," through the medium of which articles I am making an attempt to aid in some way the young men entering that profession. Being an old bird in this game, having started in the year of our Lord, 1887, as an apprentice, I am well aware of the trials and tribulations encountered while crossing the divide between the theory learned in the schools and the actual experience acquired in the dye house if the youngster ever hopes to become a practical dyer.

I stated at the beginning that I was not writing for the benefit of the old timer who has his own past experiences to draw from and who can usually get out of his difficulties in his own way. I also said that constructive criticism from them would be welcome.

Now "T. O." has criticised my way of weighing and calculating, saying: "No one uses gram scales for weighing dyes for 100-pound batches." A careful perusal of his letter shows that his mental capacity for figuring is above the average. It is higher than mine, because I cannot add two and two without pencil and paper, to say nothing of multiplying grains and drachms and scruples in my head. So I said to myself: "Now, Noel D. White, why did you figure in grams instead of grains?" Damfino. Force of habit, I suppose. You see, when I took the job of overseeing this dyehouse I found in my drug room a scale with pound and ounce weights and a Torsion balance with a beam registering grams and a set of weights from one centigram to 50 grams, so, remembering the advice given me by an old dyer who years ago was my employer and adviser, to the effect that whenever I entered a new job I should not start in by finding fault with the apparatus they had unless I could show a big improvement could be made by a change, and believing there could be no great improvement in ordering a new scale and grain weights I started weighing my dyestuff with both scales and never thought about changing.

This dye house was started by Mr. Ganster, who left to go on the road to sell the Broseo product for Scholler Brothers. His being a Pennsylvania Dutchman probably accounts for the queer way he had of weighing with two systems of weights.

On reading "T. O.'s" letter, at first I thought that he was right, and wanted to write and tell him so, but on second thought I decided to make some inquiries and find out first how far he was in the right. I went to see my friend, Harold Schroeder, who is the superintendent of the Southern Central Franklin Process Dyeing Company. I told him what had happened and asked him how he weighed his dyestuff. You can imagine my surprise when he told me—"Pounds, ounces and grams." He came to Chattanooga from the East, and maybe that accounts for it.

Of course then I began to realize that "T. O." was only partially right in some of his statements, and totally wrong when he said that no one used gram scales for weighing dyestuffs for 100 pounds of goods. But I did not stop there. I went to see P. F. O'Neill, who is superintendent of the Standard-Coosa-Thatcher Company, dyers and mercerizers of yarn, and lo and behold, he uses metric weights altogether, meaning he weighs with grams. He being another New Englander, I though then that weighing with grams and grains must be a geographical question. To make sure about it I flivvered to Rossville, Ga., to see my friend Thomas Smith, who has charge of dyeing and mercerizing for the National Yarn and Processing Company. I knew him to be born and trained in North Carolina. When I asked him for his method of weighing his dyes he answered: "Grams and milligrams!" Well that knocked my geographical theory into a cocked hat. Can it be that every dyehouse uses gram scales instead of grains as "T. O." asserts. I could not believe that, and I was quite interested by this time.

I went home and wrote a few letters to prominent edu-

cators in textile schools and to chiefs of staff in dyestuff dealers' laboratories. The answers I received were a revelation to me and partially vindicated the assertion of "T. O. (N. C.)" One and all of them answered the questions I put to them in the same way:

They teach and make laboratory tests using the metric system, that being the easiest way to find percentages. They advise using the grain scales because that is the logical way to weigh dyes for goods weighed in pounds. Then why was it that so far I had found no dyehouse using the grains weights? I must look farther.

The Browning Hosiery Mill was my next place. Here I was told that their dyer uses grains in weighing because his scale only registered grains. We went to the dyehouse and were shown a Torsion balance they use. It has a beam larger than the one I use and divided in the middle. The upper part had the grains division; the lower part registered from one to ten gr. I told them that meant grams and the scale could be used both ways, but the dyer here knew nothing of metric weights and was "doing quite well with grains, thank you."

Next I went to see Irvin Oesterich, who has charge of the dyeing for the United Hosiery Mills. I felt sure that Irvin was using grams because he is from Wisconson. I was mistaken. He said he uses grains. "Why? Didn't you learn to use grams at home?" "Yes," he said, "I used grams and pennyweights until I came down here. I found here a scale with grain weights so I started using them. What difference does it make?"

That's just it! What difference does it make providing you know your onions. It makes no difference whether you use grams, grains or buckshot. But to say that it is easier to figure in grains, now, unless one can figure mentally, like our friend "T. O.," it is going to make the problem complicated.

I have a letter here from a chief chemist in the big laboratory of a dyestuff manufacturer. He answered my query, stating they figure percentages in grams and then convert them into grains by referring to a dyer's percentage table. I am in possession of one of these tables; it is yellow with age, but I never had any use for it. I figure in grams and weigh in the same, and shall continue because I find it easy, and by what I hear other dyers of my acquaintance say, it is the best way.

Just before I started to write this down a man blew in from Indianapolis; his name is Carl E. Biek; he is in charge of the dyeing for the Real Silk Hosiery Mills. His father is in charge of the Berkshire Knitting Mills in Reading, Pa. Being brought up in the largest hosiery mills in the country, I thought his opinion would be of weight in this controversy.

"Carl," I asked him, "how do you weigh your dyestuff, grains or grams?" "Grains and grams," he said.

The following letter which I received from my friend G. H. Dubois, who is in charge of W. B. Davis & Son's hosiery mills in Fort Payne, Ala., to whom I wrote asking him how he weighed his dyestuffs, is the best answer to "T. O." I give it here in full and will let it serve as my closing paragraph, without comment, as it fully expresses my opinion in this matter:

Question. "Do you use grams or grains in weighing your dyes?" Answer. "I use both."

Question. "Do you use pounds, ounces and grams?" Answer. "Yes."

Question. "You may write me your opinion in this matter if you like, and may I use it for publication if found advisable?"

Answer. "Yes. In my opinion the practical dyer must be able to use pounds, ounces, grains and grams. This gives him a quick method of weighing his dyestuffs when time counts. I use grams for small sample dyeings, which is quick to figure percentage. For example, if I am given a two-ounce sample to dye with 5 per cent dye and 20 per cent Glauber's salt, I convert the two ounces to 56 grams, then (by multiplying):

56 grams	56
.05 dye	.20 salt
2.80 grams of dye.	11.20 grams of salt.

"Very simple and quick.

"I cannot understand why anyone should take issue with you that grains only is used. It would not be practical. If one had to weigh three pounds he would have some figuring to do to convert this into grains. This is a very interesting argument and I know you will win out. Will be glad to talk further on this subject when I see you."

I sincerely hope to see some further argument on this question in "Knitting Kinks."

NOEL D. WHITE.

Conditioning Silk Before Knitting.

EDITOR COTTON:

Contributor "H. D. (N. C.)" is troubled with silk that is too dry for working properly. I believe if he will read the following experiences we had in that line he will find the answer to his query.

Bearing in mind that silk in any stage of operation is, of all fibers, the most sensitive to atmospheric conditions, all he has to do is to keep his shipments in a place where the moisture in the air is most constant. The cellar or the basement makes an ideal place. If he has neither he can easily build a place suitable for his need.

We were making a line of chiffon crepe woven with a one strand silk with a very hard twist in it. If that silk was not kept with the proper amount of moisture it would kink and make it miserable for the weaver. When we started having trouble on that account, we used to take a box full of spools containing that silk, which was too dry to work, into the dye house, place it in an empty vat, cover up the top with canvas and turn the steam into the vat for one hour or longer. That helped for the time being, but we could not do that indefinitely. We had to find a real remedy. We had neither a cellar nor a basement, our mill being built on a low piece of land.

We selected a sheltered corner outside of the mill and built a brick vault, 8 x 12 feet and 7 feet high, a foot deep in the ground and no floor except a few pieces of wooden laths over the earth. On one end of this vault we put an iron grate eight inches by two feet long, a few inches above the ground at the outside level, and on the opposite end a door big enough to admit the cases in which our shipments of silk were packed.

We kept all our silk yarn in there, and all we had to do on very dry and hot days was to turn the hose on that vault and soak it thoroughly.

When silk gets too dry it gets full of electricity, static, or wind, whatever you choose to call it, and it is hard to work it in that condition, but I have seen girl winders im-

prove the working condition of silk yarn by simply sprinkling the floor with water under the swift of the winding machines.

On a hot windy day in the dressing room of a spun silk mill a mechanic was trying to fix a dressing machine that refused to work properly. He worked and worked, but could get no results. Disgusted, he left the job and whether purposely or inadvertently, he kicked over a bucket of water and spilled the contents directly under the machine. He paid no attention to it, went outside in the yard for a smoke and after a while came back and found that the recalcitrant machine was working as well as ever.

The water under the machine had changed the atmospheric condition of the silk on it just enough to give it the proper working moisture. He reported the case to the superintendent and shortly afterwards a complete humidifying system was installed in that room and throughout the whole mill.

Maybe what "H. D." needs is a humidifier to keep the silk in condition in his mill. D. N. (TENN.)

EDITOR COTTON:

The problem suggested by "H. D. (N. C.)" in the August issue of COTTON offers an easy solution if he will demand that the silk he is knitting be thrown with a soluble soaking oil rather than a mixture of soap and oil. By the use of a high grade neatsfoot oil, the silk will retain its moisture for a greater length of time than when a soap and oil mixture is used, and will be in excellent knitting condition many days after throwing.

Should this be too hard and dry the mill could back wind on a No. 50 Universal winder equipped with an emulsion trough. The use of about two ounces to a gallon of back winding oil in the trough should be ample.

The silk should be removed from the machine each night and placed in a humidor. This can be made from heavy gauge galvanized sheets equipped with a sliding door. The shelves should be made of perforated iron well painted. Moisture is supplied on each shelf by using some of the back winding emulsion. This is placed in a pail and into the pail is hung a piece of burlap. This is allowed to protrude over the edges of the pail so it makes a wick. Care should be taken to avoid dripping onto the silk. In the morning the silk is removed from the humidor and taken to the knitting machine. C. H. (PA.)

Preventing Oil Spots on Hose.

EDITOR COTTON:

In a recent issue, "Contributor No. 4256" submitted a question stating that he was bothered with oil spots on the instep and in the gores of the heels and toes of stockings made on a K machine. He thought this was the result of cleaning the cylinders, filling them in with new needles and sinkers. He said he understood that they were caused during the process of knitting the heels and toes. The long needle butts being thrown up out of action while a part of the short butts knitting the gores are thrown in and out. Those up and down movements he said, seemed to collect the oil and leave it in the stitches. I have examined the sample which he submitted showing this defect, and in my opinion, the streaks which he referred to are not oil streaks at all, but are nothing more or less than a metallic stain which comes off of the new needles and sinkers. This can be proven by taking a new needle and rubbing it with a piece of white cloth or knitted fabric, which will make a dark spot on the cloth.

I do not know of any way to avoid these streaks, but would suggest to anyone having this trouble, when he fills up a machine with new needles and sinkers, to take a cone of soft cheap yarn and put it on the machine and tighten the fabric as tight as it will stand and knit several heels and toes. This will soon wear that metallic stain off of the needles and sinkers.

T. B. (TENN.)

Uneven Silk.

EDITOR COTTON:

I note that "C. B. (N. C.)" has asked a question in reference to rings appearing in hosiery where pure silk and rayon is used.

The rings referred to are caused by unevenness in the pure silk and can only be lessened by purchasing the best grade of silk obtainable and have same tested for evenness. It is impossible to purchase silk that does not contain a certain percentage of unevenness, but if the questioner is purchasing a lower grade of silk for the purpose of reducing the cost of his product he can expect to have his silk very uneven. All manufacturers are continually striving to purchase silk that does not run light and heavy, as this is very important in reducing seconds.

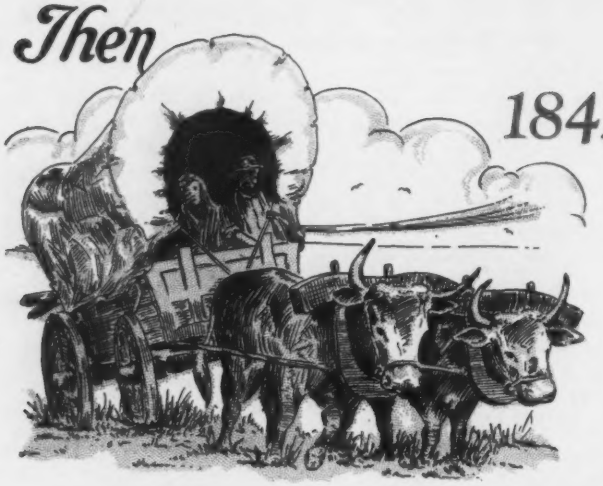
However, all manufacturers of silk hosiery have this to contend with and the only way one can reduce seconds and at the same time satisfy the customer is to use care in what shades or colors the hosiery is dyed into.

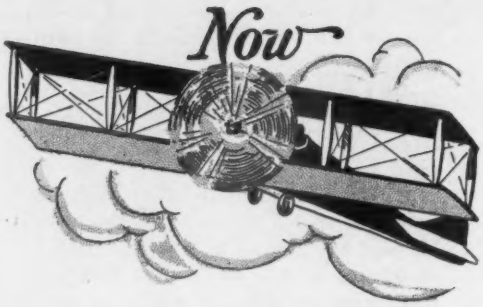
My policy in dyeing hosiery where the silk has been very uneven is to sort out the best stockings and dye them into the darker shades or colors. The hosiery having the most pronounced rings we dye into the lighter shades, trying to put them into shades of a pinkish or flesh tint. A good way of determining what shades to use to dye hosiery that are very uneven in the silk, is to put the arm through a dyed stocking that is very uneven and if the rings do not show up when on the arm these stockings can be considered as first quality and such hosiery can be dyed in this shade. When dyeing hosiery in such shades as Gun Metal, Black or Dark Brown, one must be careful to select only hosiery that is almost free from unevenness in silk as these are the shades in which the rings show up most when worn and therefore are considered as seconds.

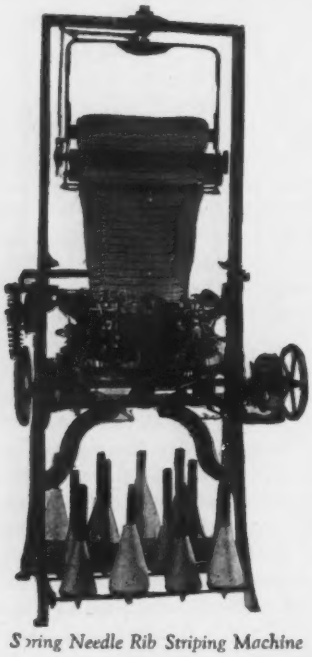
I am sure there is nothing that "C B. (N. C.)" can do to eliminate the trouble of rings entirely, but if he will try to purchase the best silk, have it tested by a reliable testing house, have it thrown by a good throwster and sort it into lots so that the poorest hosiery is dyed into lighter colors, his complaints will be lessened and seconds will be reduced as low as it is possible. CONTRIBUTOR NO. 806.

EDITOR COTTON:

The trouble of rings in a ladies' hose of three-thread silk plaited over 150-denier rayon, submitted by "C. B. (N. C.)" in the August issue of "Knitting Kinks," seems to be purely one of uneven silk, and can be overcome only by using higher grade silk. Rings showing in the sample would not necessarily indicate uneven silk, as the silk used has been colored by the throwster for lot identification. The colors







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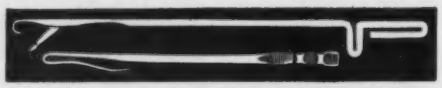

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used for this purpose are very fugitive, and come out readily and perfectly in the degumming process; and no attempt is made to apply the color uniformly to the silk. This oftentimes results in giving a "ringy" appearance to unfinished hosiery, but evens up in the finish. However, "C. B." clearly states that the rings show up after dyeing and finishing, and this clearly indicates uneven denierage or endage. This trouble has been all too prevalent in all grades of silk for the last several months, and if "C. B." is using a grade lower than Crack XX, his trouble is a most natural one; and the only way out is to use higher quality silk. If he is buying Crack XX grade he should call for a more careful inspection of the silk by his throwster.

"C. B." does not state what method of dyeing he is using but I would suggest the "two-bath" method, that is, to discharge the degumming bath and dye in a fresh bath. Otherwise, he will get dyeing trouble from the "identification color" used on the silk as this color will go back on the goods when salt is added to the bath and will result in uneven dyeing and off shades.

CONTRIBUTOR No. 805.

EDITOR COTTON:

I note the question of "C. B. (N. C.)" who states that he is having trouble with rings and bands in a ladies' stocking of 3-thread silk plaited over 150 denier rayon.

This is a problem that we all have and is rather hard to get away from due to the irregularity of the tram silk which is available, this being very noticeable in the lower grades.

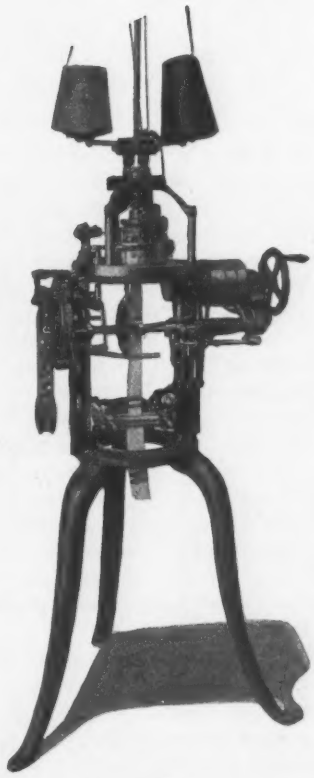
There is very little that we can do about this difficulty as we find it in all silks. However, I believe if "C. B." will quit using tinted silk he will have less trouble in his boil off, as this is only a fugitive dye and is not level. There is no certain way of determining whether it is plaited level, and I presume he is using the tinted silk for that purpose. I would advise him to take some of his regular stock of rayon and have it dyed a Direct Black and then treat it and oil it in the same way as his regular rayon and plait his pure silk over it. This is the only positive method I know of in plaiting. H. H. (N. C.)

EDITOR COTTON:

You submitted to me the question of "C. B. (N. C.)," as published in the August issue of COTTON, and the sample he sent showing his difficulty of rings in a stocking made of three-thread pure silk plaited over 150-denier rayon. He wanted to know what causes these rings or bands.

An examination of this stocking under the pick glass shows the normal section on either side of the ring to count 33 courses per inch, while the ring section counts 34 courses per inch. The tighter fabric indicates heavier yarns. The question is, which of the two yarns is running heavy—the rayon or the pure silk?

By raveling a section of the normal fabric and separating the two threads and winding them on a black cardboard at opposite ends of the board, labeling the rayon *A* and the pure silk *B*, then going through the same operation of raveling a part of the heavy or ring section and winding the rayon on the card beside the rayon, and the pure silk beside the pure silk, labeling the rayon A-1 and the pure silk B-1, we can make a comparison of the rayon from the normal and ring sections of the hose, and a comparison of the pure silk from the normal and ring sections



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of the hose. This comparison reveals a decided difference in the size of the pure silk which is causing the trouble. The only thing that will correct this trouble is better silk. The test of knitting a stocking with the three-thread silk only, as "C. B." said he has done, and producing rings in the stocking, is sufficient evidence of where the trouble is.

D. W. (N. C.)

EDITOR COTTON:

Trouble with rings in a ladies' stocking made of three-thread pure silk plaited over 150-denier rayon was brought up by "C. B. (N. C.)" in "Knitting Kinks." This difficulty comes from various sources; while for some there is a remedy, he will find it extremely difficult to eliminate all.

The sample stocking he submitted to show the nature of his trouble is made up of mercerized top, heel and toe, and the boot is of the pure silk and rayon. The top of the heel is fashioned Pearmit style. There are rings of various intensity and width in the boot of the stocking, which do not appear to be caused by the same source.

A narrow ring just below the welt, and another one two inches below the first one, but about one inch wide, are quite prominent, and look like they were knitted with a coarser yarn. Pulling the stocking at this point through the thumb and first finger I could feel the difference in the knitted fabric very plainly. At different intervals there are other rings which look like they were produced by tightening of the thread.

The knitting runs smooth for several inches, then a tight place occurs, causing a ring to show all the way around, then running smooth again for a few inches, then another tight place and so on to the bottom of the stocking.

By enumerating some of the causes that may do this in the knitting, we may help "C. B." to overcome part of his troubles. Every hosiery mill, whether on circular or full-fashioned work, has to contend with this same trouble to a certain extent. Here are some of the principal causes: First and foremost is uneven yarn. That comes in the natural silk as well as in the rayon and other fibers. In the natural silk unevenness is caused sometimes by the silk worm failing to produce a thread of uniform size, and sometimes by the little Japanese girl failing to combine the right number of threads from the coccoons to produce raw silk of standard size, while she is dreaming of moonlight and cherry blossoms, totally oblivious to the fact that she is brewing trouble for "C. B." and all the rest of us. This is the reason why silk is sold in 14 to 16, 15 to 17, etc., denier, which is the French weight used for determining the size of the silk.

When silk is used for weaving the small difference in size is almost invisible to the naked eye, but in knitting the looping of the threads makes even the smallest unevenness in size show up prominently. Dyeing will not eliminate that.

This may be the reason "C. B." found he has ringed knitting with silk with the rayon removed.

Another cause of uneven knitting is from the thread coming to the knitting needles soaked too heavily with knitting oil. A different impregnation of the yarn will cause a difference in the knitting and this appears to me to be the cause of the heavier knitting showing in the narrow and wider rings at the top of the stocking examined. Cups too full of oil may cause that.

Uneven tension causes uneven knitting. A jar to a machine in operation will cause a heavy ring in the stocking. A knot in the yarn passing through a needle will jar the sensitiveness of the machine enough to cause a tightening of the stitches and show up in a ring like the ones found in the lower part of the boot of the stocking under examination.

I hope "C. B." will find the remedy for some of his trouble in the foregoing suggestions, but he may remain assured that there are many, many in the same boat with him.

T. N. (TENN.)

EDITOR COTTON:

I observed in a recent issue of "Knitting Kinks" that "C. B. (N. C.)," making a ladies' stocking from 3-thread pure silk plaited over 150-denier rayon, is having trouble with rings showing up in the stocking, even after boiling and dyeing. He said he had taken the rayon out, and the rings show up distinctly in the thread silk.

The fact that he submitted only a sample of the grey stock makes this query more difficult to answer. In such a case there should be a hosiery sample taken from each process that the hosiery goes through, the grey stock, from the boiling off or degumming bath, and the finished dyed sample. This would greatly aid in the correct solution of problems of this kind.

There is a possibility of the sinkers being out of adjustment on the machines, and in addition to the causing of uneven plaiting, this is a source also of these rings. "C. B." should have a thorough examination made of all tension points on his yarn in the line-up of his knitting room. By summarizing all possible causes in the plant and operating end, then he can know whether to blame his yarn or the knitting department.

These rings on the hosiery are apparently caused in the knitting operation, and the unevenness in the silk helps to cause it. I would suggest that "C. B." order three new batches of silk yarn from three reliable dealers, and have a nearby mill make up several dozen each from the three samples of yarn, doing the same in his own mill. Then, saving a few hose in the grey stock from all six sets of samples, and boiling off or degumming some hose, saving a set from this process, and then saving a set from the dyed and boarded hose, he can check each result and operation closely. It has been my observation that this type of rings have always been blamed on the dyehouse, as caused by poor handling, and are called "water rings."

"Water rings" are usually caused by and aggravated by the great changes in temperature that the hosiery goes through in being processed, both in the dyehouse and boarding room. This type of ring is caused by poor selection of the silk yarn and the lack of proper chemical control in the rayon manufacturing plant. My suggestions in this connection would be something as follows:

Have the dyer use a warm wash after the boiling off or degumming bath. If he uses a two bath method of dyeing, do not use cold water under any circumstances on the first rinsing. For the one bath method, he should use lukewarm water if possible for the first rinse.

The sudden change from a 200-212 degree temperature to a 80-100 degree F., temperature causes both physical and chemical changes in the rayon and silk yarn. This may account for some of the trouble. It might be a good idea to add a hot water container to the dyehouse equipment and have pipes to each tub or dyeing machine, instead of the usual cold water that a large majority of dyehouses have. If this hot water heater equipment is too

expensive, a steam connection could be made onto the cold water pipe at each tub. Thus the steam into the cold water can be so regulated as to secure the necessary warm water for running. CONTRIBUTOR No. 802.

EDITOR COTTON:

In the August issue of COTTON we note that "C. B. (N. C.)" is having trouble with 3-thread pure silk plaited over 150 denier rayon, the hose having rings around them when finished.

We are positive that the trouble is not in the machine, as all of them would not be out of adjustment at the same time. To prove this, I would suggest that "C. B." take the pure silk off and run rayon for awhile. If the rings do not appear then the trouble is in the silk. I have had the same trouble with rayon and mercerized and am quite sure that the trouble lies in faulty winding. I would suggest that "C. B." get some silk from another manufacturer and try this out.

I do not think it necessary to go into detail as to what would cause this on the knitting machine. However, if "C. B." is not satisfied that bad winding is the cause, and you will grant me space at another time, I shall be glad to discuss the mechanical causes with the readers of "Knitting Kinks." T. E. (N. C.)

Overcoming Crooked Stockings.

EDITOR COTTON:

I notice in July COTTON that a fellow down in the Carolinas asks the question "What causes a crooked stocking?" stating that he knows some of the reasons are "needles being off, throat of sinker being too thick, cylinder being lop-sided, etc." I will give below some further suggestions as to causes of this thing.

One of the main reasons is found in the sinker head, that part the sinkers ride in. This sinker head slips down over the top of the cylinder and should ride on a slight ridge on the cylinder. It is fastened by screws. If the sinker head is not level, one side will raise the sinkers up and the sinkers on the other side will be lower, causing the crooked stocking. This is the first thing to look for.

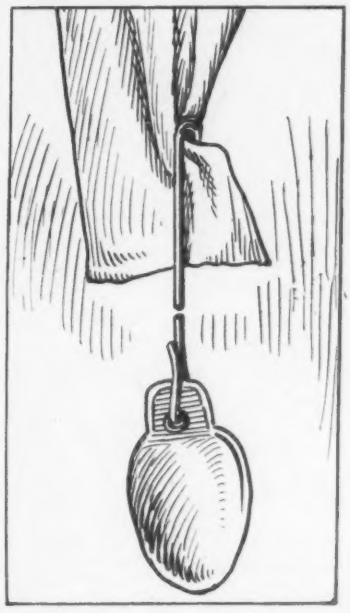
After a machine has run for some time, the lint and dirt start to gather in the stitch ring, inside brass ring, and this keeps the sinkers from getting the entire throw; in other words, the sinkers do not go in for the same distance. In case this lint and dirt gathers more in several of the slots where the sinkers ride, lighter in others, etc., where it is heavier the sinker will draw a tighter stitch, and where the accumulation is lighter, the sinkers will go in further and the stitch will be looser, so that when the stocking is finished, it will be crooked, having loose and tight streaks.

The inside brass ring, the stitch ring, in some machines is soldered to the cylinder and in some machines it is screwed to the cylinder. This ring may work loose and tip up, causing the same trouble as mentioned in the second paragraph, it being understood that the stitch ring is lined up squarely with the outside ring so the sinkers will ride free without binding.

If the machines are Banners, equipped with the double sole slackening device, it may be that the cams are not even, permitting the short needles to knit a looser stitch, which also causes a crooked stocking. The Scott & Williams sinker slackening double sole cam can cause this same trouble.

I find that a good way to eliminate this trouble quickly is to switch cylinders from one machine to another. Nine times out of ten I find this stops the trouble at once.

Another suggestion, if half-hose is run, is to hang a weight on the stocking to pull all the stitches even. The accompanying sketch illustrates what I have in mind. The



wire is about six inches long, and the pear-shaped weight weighs about ten ounces. It is hooked on as the operator inserts a new top in the machine. T. F. (WISC.)

EDITOR COTTON:

In the July number of COTTON "H. Y. (N. C.)" asked a question in regard to the causes of a crooked stocking. There are quite a few things which would cause this.

The inside sinker ring becoming loose is one thing which would cause this. It is sometimes hard to tell whether the sinker ring is loose or not unless the needles and sinkers are taken out.

If the stocking is knitting shorter on the short butt needles and looser on the long butt needles it will cause a crooked stocking. This is caused by the bottom point of the left hand stitch cam not being ground square across the bottom causing the long needles to draw a longer stitch.

If the stocking is knitting too tight in the foot and loose in the boot of the stocking it will have sort of a twist when it comes off.

The outside sinker ring becoming loose will let it tip up on one side enough to cause a crooked stocking.

CONTRIBUTOR No. 816.

New Edition of Knitting Directory.

The 1927 edition of the American Directory of the Knitting Trade in the United States and Canada has been published, being revised and brought up-to-date in each section. This book lists the knitgoods manufacturers, alphabetically, geographically and according to product, as well as manufacturers of woven cotton underwear, rayon underwear, and other valuable information. The price is $2.00 per copy, postpaid. Bragdon, Lord & Nagle, 334 Fourth Avenue, New York City, are the publishers.

The Yarn Market

Philadelphia, Pa., September 15th, 1927.

A comparison of the price list appended hereto, showing the published yarn quotations in the Philadelphia market on yesterday, with the list appearing on this page last month, as of August 15th, will disclose that during the month intervening between these two dates, practically all of the pivotal or more important numbers in the list have experienced an upward revision in price averaging around five cents a pound.

This ascent in the theoretical value of yarns cannot be attributed in any way to an increased inquiry or better demand; but was the result almost entirely of outside influences, mainly that of the raw cotton situation as regarded price.

The first week of the period found the market still unsteady under the influence of the first Government crop report that sent cotton toward the sky, and which also resulted in good business of an immediate nature. This week was spent largely by dealers trying to induce forward buying, but it seemed most everybody had either contracted for goods immediately after the rise, or were deciding to await a possible decline. To their way of figuring, the inclusion of potential weevil infestation, and the effect of the higher price in influencing farmers to place cotton on the market, would be offset later.

There was comparatively little change in conditions during the next week. Trading continued dull and small-lot, due mainly to the uncertain and irregular conduct of cotton prices, with their concomitant effect upon yarn rates, buyers staying out of the market, content apparently to drift along, with no intensive effort being made by the selling end of the market. There was considerable speculation during this period as to the probable effect of the approaching presidential campaigns, since it was recalled that the finished goods for which materials were now being secured would go into consumers hands finished during the intensity of the campaign. There were, as usual, arguments citing both harmful and beneficial effects of the political situation.

The approach of the Labor Day recess was added to the existing conditions in restricting interest and activity during the third week, with lassitude and postponement featuring such action as buyers were moved to take. Furthermore, beyond the holiday would come the report of September 8th, which was anticipated by both schools of thought to justify the predictions made as to the authenticity of the August condition report.

On Thursday of the fourth week, the Government released its crop estimate of 12,692,000 bales, which, sending cotton to new high levels, also virtually paralyzed trading in the yarn market temporarily. It made yarn quotations almost out of the question without adjustments, with the result that rates were withdrawn. The report controverted the prediction of a more bullish situation, and so contradicted the plans made by many buyers that a standstill existed in the market. For the most part, it was felt that the report was from 200,000 to 300,000 bales under the generally anticipated figure.

When quotations were returned to the market, it was found that carded weaving yarns, particularly, had experienced an improvement under the influence of the report, with knitting numbers remaining very firm on the basis established on the day of the report.

All in all, the week produced about a two-cent gain in values for all yarns, bringing them up to the level shown in the accompanying price list. The spinners at the moment unquestionably have assumed the dictatorial position, with dealers submitting to their demands as to price. With the spinning end refusing to quote on some of the inquiries received after the report last Thursday, it would seem that their position is one of confidence in developments, and that given a higher rate, they anticipate that the business necessary to make the market profitable to them will follow.

Philadelphia prices on September 14th follow:

Single Skeins.

4s to 8s	35½	10s	36
12s	36½	14s	37
16s	38	20s	39½
24s	40	26s	42
30s	44½		

Two-Ply Warps.

8s	36	10s	37
12s	37½	14s	38
16s	39	20s	40 @40½
24s	44½	30s	46
40s	54½ @55½		

Carpet and Upholstery Yarn in Skeins.

8s 3-4 hard white warp twist	35 @36
8s and 9s tinged tube	32 @33
8s 3-4 hard twist waste	31 @32

Two-Ply Skeins.

8s	35½	10s	36½
12s	37	14s	37½
16s	38½	20s	39½
24s	41½	26s	43½
30s	45½	40s	54½

Two-Ply Warps.

8s	36½	10s	37 @37½
12s	38½	14s	39½
16s	40½	20s	41 @41½
24s	43½	26s	45½
30s	46½	40s	55½

Frame Spun Carded Yarn on Cones.

8s	35½	10s	36½
12s	37	14s	37½
16s	38	18s	38½
20s	39½	24s	41½
26s	42½	30s	43½
40s	54½		
30s double carded			46
30s tying-in			43

Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	50	20s	53
24s	56	30s	57 @60
40s	65 @68	50s	73 @75
60s	85 @90	70s	95 @97
80s	1.00@1.10		

Single Combed Peeler Yarn on Cones.

18s	48	24s	51½
30s	55	36s	59
38s	62	40s	63

Mule Spun Carded Yarn on Cones.

10s	39½	12s	40
14s	40½	16s	41
18s	41½	20s	42
24s	43½	26s	44½
30s	46½	40s	57½

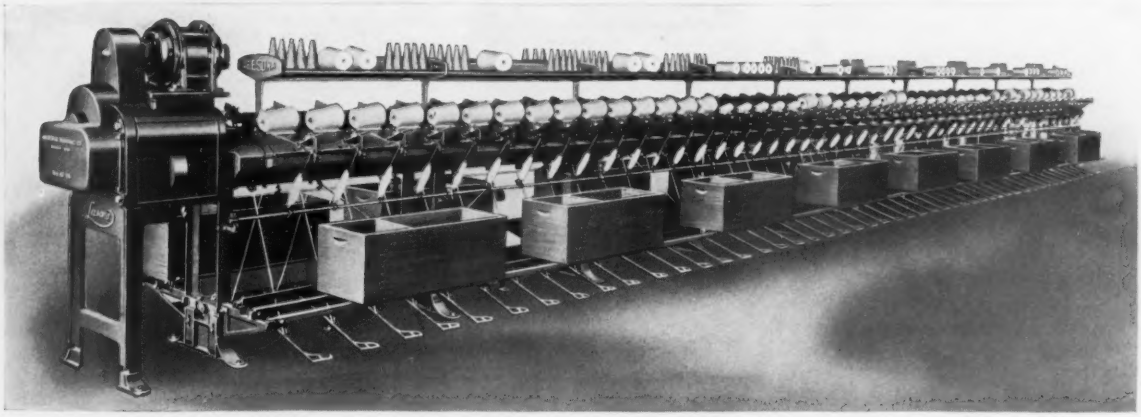
Mule Spun Combed Peeler Yarn on Cones.

10s	48	12s	49
14s	50	16s	51
18s	52	20s	53
22s	54	26s	56
28s	57	30s	60
36s	63	38s	64
40s	67		

New Acme Staple Plant.

Acme Staple Co., Camden, N. J., are occupying their new modern factory building, where Acme binders, tackers and staples, going into practically every industrial and commercial field, are manufactured. This company, started in 1894, has grown rapidly to its present capacity, requiring the enlarged quarters now being used.

AN ACHIEVEMENT
SELDOM EQUALLED IN ANY INDUSTRY



NO. 60GF LEESONA UNIVERSAL WINDER FOR SPINNER OR KNITTER

Moderate price, better than average quality, durability, high productive capacity, and low operating cost — these are the features that make for wide acceptance and general adoption of any mechanical device in any field. But *all* of the elements must be present. Not a single one must be obtained at the expense of another. If any one is lacking, the product automatically falls into comparative obscurity.

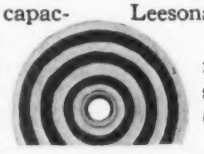
So seldom is a combination of *all* these features effected in any industry that its attainment is unusual,— a rarity.

In producing the No. 60GF Leesona Universal Winder we have attained the unusual. We have combined moderate price with better than average quality, durability, high productive capacity, and low operating cost.

This machine winds cones either for knitting or for shipping purposes; also for high-speed warping in a Leesona Universal Cone Creel.

Equipped with ball bearings, it requires less than 3 H. P. to operate 98 spindles at a yarn speed of from 450 to 600 yards per minute. Because of its high speed it requires less floor space for a given production than ordinary spoolers or winders. It has self-threading tension, foot start, and affords maximum convenience in doffing both supply spindle and product spindle. Materials and workmanship are in every way equal to the high standard which has always made Leesona stand for durability.

Whether your winding problem is coning, tubing, or something else, Leesona can offer the solution. Ask a Leesona sales engineer to call, study your requirements, and make recommendations. Your request will not obligate you. Use the coupon now.



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This Company is at present the largest organization in the world making winding machines exclusively. Supremacy in size is the logical result of supremacy in demand. Supremacy in demand follows leadership in conception, execution, materials, and service.

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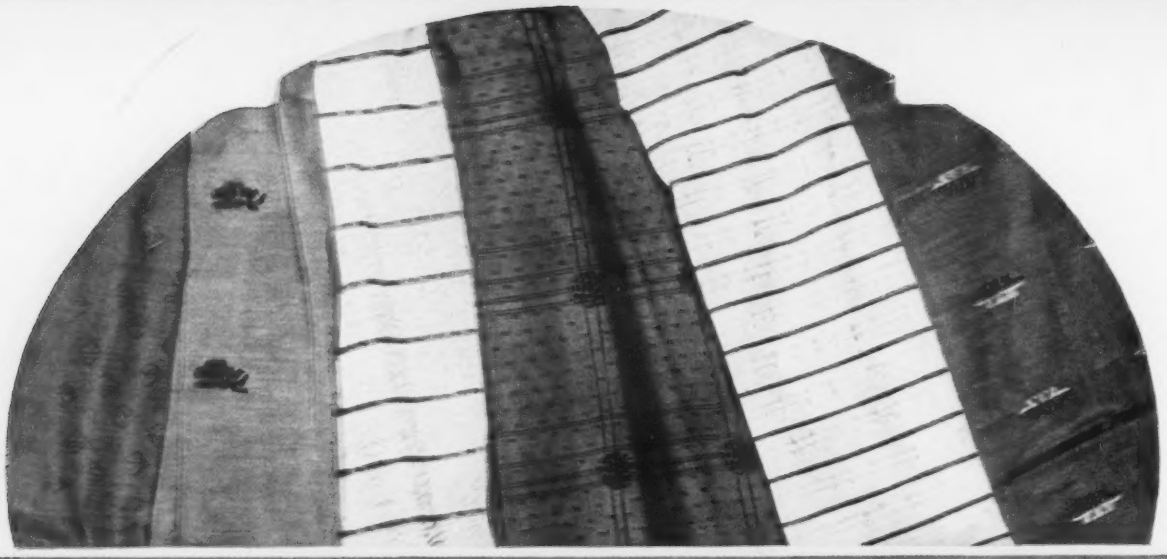

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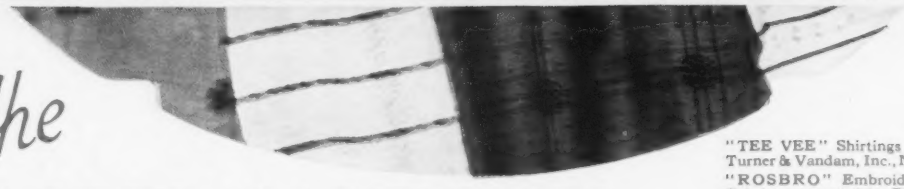

"TEE VEE" Shirtings converted by Turner & Vandam, Inc., New York City

"ROSBRO" Embroidered Silktone Fabrics, converted by Rossman Bros., New York City.

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Turner & Vandam, Inc., converters of "Tee Vee" fabrics, and Rossman Bros., converters of "Rosbro" fabrics, have been very successful in creating popular stylings. It is significant that coincident with their success, they have made generous use of Franklin Process Colored yarns.

Is COLOR yielding you satisfactory sales and profits? We have made COLOR do this for many customers at surprisingly low cost because the Franklin Package reduces winding costs in the mill. We have also assisted many customers in finding a market for their products.

Given the opportunity, we can probably do as much for you. It will cost you nothing to investigate. Why not fill in and mail the coupon now?

A Franklin Package of Dyed Yarn.

It will deliver freely by rotation or over end.

FRANKLIN PROCESS COMPANY

Largest Job Dyers of Yarn in America
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The Knit Goods Market

Advances in cotton hosiery and a tendency toward declines in silk have caused some confusion in the primary markets, men's women's and children's hosiery being affected. The attitude of distributors has not tended to clarify the situation, which, however, is righting itself, under apparent steady consumer demand, forcing jobbers and retailers to accept conditions brought about by ups and downs in raw materials, so that normal fall trading may be looked for.

A slower market for underwear was brought about by the course of cotton. What may be the aftermath when higher prices reach the consuming public is a matter for conjecture. A considerable part of the retail trade will own little of men's heavyweight underwear at the season's opening prices. A minority element made its commitments before manufacturers' advances became effective, but cannot be said, of course, to be covered for the winter's needs.

Sweaters continue to hold first place in activity in the knit goods markets, after a long period of indifference on the part of jobbers, who are now clamoring for deliveries. Due to tardiness in the earlier months, and their ultra-conservatism when placing initial orders, jobbers are crowding mills with reorders, many of which will be filled very late in the year.

Hosiery.

Illustrative of the new values of low end cotton hosiery, which has been hard hit by the higher cost of cotton yarns, are the advances announced a few weeks ago by two southern mills approximating 18 per cent from the year's low. The Bell Hosiery Mills, Suffolk, Va., advised jobbers of an increase to one dollar a dozen for misses' carded ribs. The Meridian (Miss.) moved its line of 176-needle half hose to 97½ cents, although at the time making deliveries at 85. Announcement of this advance was accompanied by instructions to jobbers that in order to receive deliveries at the former price of 85 cents they would have to forward details promptly. Necessarily the old orders stuck, and early September showed a jump in shipments. Northern representatives of mills, generally, reported a slowing down in new orders, which was nothing more than had been expected. And now looms trouble for jobbers, particularly those who will take in goods at the new prices.

The Bell line of carded ribs were twice marked up since the beginning of the rise in cotton. Late in August business was being taken at 90 cents a dozen, and two weeks later the price went to 95, followed shortly by announcement of one dollar. Jobbers who had refused to speculate on anticipated needs of retailers were caught high and dry, and say they will have difficulty in passing the advances along to the stores . This is, of course, a repetition of an old, oft-time told story, with a new complication, in which declines in full-fashioned silk figure as a factor.

Some of the direct-to-retailer manufacturers of silk hose had reduced prices. Dealers buying from jobbers necessarily insisted upon reductions. They affected not to understand why cotton hose should cost them more money. They wanted the penny from the silk mills and the cake from the cotton mills. They got the penny, for manufacturers distributing through jobbers had anticipated the reductions of the direct sellers, and the stores recently had not been paying former prices. They were favored in an abundance of ready-to-ship silk hose of both full-fashioned and seamless. And as demand had not fully caught up with production, as to some lines, buyers were prone to look for further downward revisions, in which there seems a certainty of disappointment and a repetition of what was experienced in relation to cotton hosiery—an overstaying of the markets.

Statistics are, ordinarily, dry reading, often not wholly dependable as information, and in selfish hands may be wilfully made to be misleading, but in their present application to hosiery production they serve to illuminate a somewhat clouded situation. Accepting at their face value the reports of manufacturers to the Department of Commerce, there is likely to be no super abundance of either silk or cotton hosiery for a normal Fall and Winter business. The reports, while not conclusive, are fairly indicative of a solution of the problem whether there is or is not overproduction, covering, as they do, more than 60 per cent of the entire output as shown in the last preceding industrial census.

Comparing with June, production of all classes of hosiery in July declined by 25 per cent, although being slightly in excess of July, 1926. But 1927 scored gains over 1926 in both shipments and orders booked. As indicating that distributors left much undone in July to be done later, a tabulation shows that in July last there was a falling off from June of 23 per cent in orders booked and approximately 18 per cent in shipments. Assuming consumption for the remainder of this year will compare favorably with that of 1926, the July stage of production would indicate no excess of hosiery as a whole.

Notwithstanding the expansion in the full-fashioned industry, the output of women's full-fashioned silk to the end of July was increased, apparently, by only 19 per cent over the first seven months of 1926. But during the same period production of seamless is reported as showing a decline of 23 per cent. The really big drop in seamless was in silk-and-rayon as a combination yarn, which is the contrary of men's half-hose of like construction. The production of silk-rayon half-hose mills was 114,000 dozens in July, comparing with but 74,000 dozens in the corresponding month of last year.

While veiwing the statistics in their most favorable light, the fact remains that to the end of summer there was produced more of women's silk hosiery than the market was absorbing, as evidenced in price declines while production was being curtailed during July and August. Much of the surplus was embraced in long hem hose, which, however, seems to have been pretty well cleaned up. Many thousands of dozens of service weight 20-1 inch boot passed over the counters in department stores for 75 cents a pair. This price has disappeared in large establishments where it had been featured, and in its stead is the dollar ticket, with demand from dealers for more of the goods as a dollar feature.

With manufacturers stressing silk-to-top there seems a

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METAL DRYING FORM

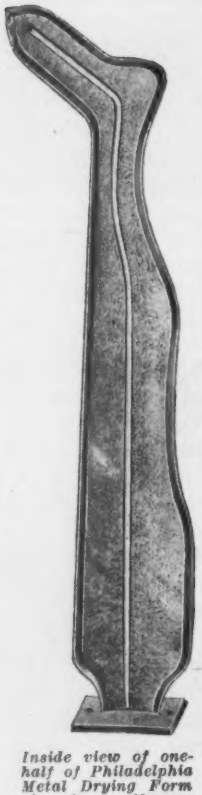
WOULD HAVE PREVENTED THIS EXPLOSION!

Actual view of the form shattered by explosion.

THE recent explosion of a drying form in a prominent* Philadelphia hosiery mill as shown in the illustration could have been prevented by using The Philadelphia Metal Drying Form, because the two halves of our form are made separately and joined by a special welding process. In this welded "safety seam" lies the extra margin of protection provided by the Philadelphia Metal Drying Forms.

Repeated experiments have proved conclusively that Adjustoe Forms will hold steam pressure far above the actual requirements of normal operating conditions, but if for any reason the steam should reach explosive force the "safety seam" will open up, thereby reducing the pressure and protecting the operator from serious injury.

Can you afford not to provide yourself and your employees with this protection?



Inside view of one-half of Philadelphia Metal Drying Form showing flange which forms "safety seam" after welding.

The Adjustoe low pressure steam heating system requires no pump or motor to operate and maintains constant temperature at any point selected between 100 and 200 degrees.

Adjustoe Forms are hollow, all-metal units, highly polished on all sides for fast boarding and are guaranteed for workmanship, material, and heating qualities.

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* Name furnished on request.

possibility that until production and consumptive demand comes to be better balanced, the four-inch welt stocking may be left in an uncomfortable second place. It should, however, hold well for Fall and Winter, especially for street wear, rated as representing logical construction from the angle of durability at a point of severe strain.

There is well distributed demand as between chiffons and service sheer hose. If there is a surplus of either type it probably would be found in the chiffon group, in which somewhat recently there were offerings at prices so low as to leave the inference certain mills were burdened with stock. In fact, the mills to which silent reference is made were operating on a much curtailed basis. With full-fashioned hose more a merchandising than a manufacturing proposition, there has been, and to some extent still is, an uneven stage of plant operation.

Of two not leading mills in Philadelphia, one selling to retailers, the other to jobbers, one is operating on day and night schedules and the other employing two 10 hour shifts of operatives. The latter sells to retailers and, it was stated a week or two ago, "we never were busier". Several more pretentious establishments were on a four-day week schedule, although their brands are nationally known. It appears the more comfortably situated northern full-fashioned mills are the larger ones, selling mostly to quantity buyers. The Berkshire in Reading and the Apex in Philadelphia, for example, were producing at capacity basis, while numbers of small plants were on a 50 per cent scale. Conditions among mills, it is made apparent to observers, vary with the extent to which their lines are entrenched in the trade and their reputation for adherence to standards and delivery schedules.

Although there is an indicated decline in the output of seamless silk hosiery, business with leading mills is running along on a pretty nearly even keel, and a southern mill here and there is increasing capacity. Thus far the reductions in the prices of the Quaker Hosiery Co., Philadelphia, and the Phoenix Hosiery Mills, Milwaukee, both full-fashioned, have caused no disturbance to prices of standard lines of either spring or latch needle goods, and as these are coming off in all-over silk, the top-notch grades are no less acceptable for the dollar-a-pair division.

The Colonial Knitting Mills, Philadelphia, are operating their spring needle plant to capacity, turning off around 450,000 dozen pairs a year, and shipping out their production. The company's pivotal number is a dollar stocking. Harry A. Norris, the president, although he heads a full-fashioned mill which but a few weeks ago got into operation at Mohnton, near Reading, Pa., visions a continuance of steady business. "I entertain no false illusions in regard to seamless hosiery," he said a few days ago in a discussion of the outlook. He holds to the view there always will be a profitable field for properly made seamless and that as consumption in silk stockings is on the increase he also has no misgivings over having established the Mohnton full-fahioned mill, now operating its first unit of twelve machines and designed for the addition of three such units.

The Penn's Valley Hosiery Mills, Philadelphia, recently introduced a line of featured rayon-to-top 260-needle hose, for the dollar-a-pair bracket. It is being well received, it is stated by the management.

Women's rayon hosiery of average types continues in comparatively light demand, which may be ascribed to low

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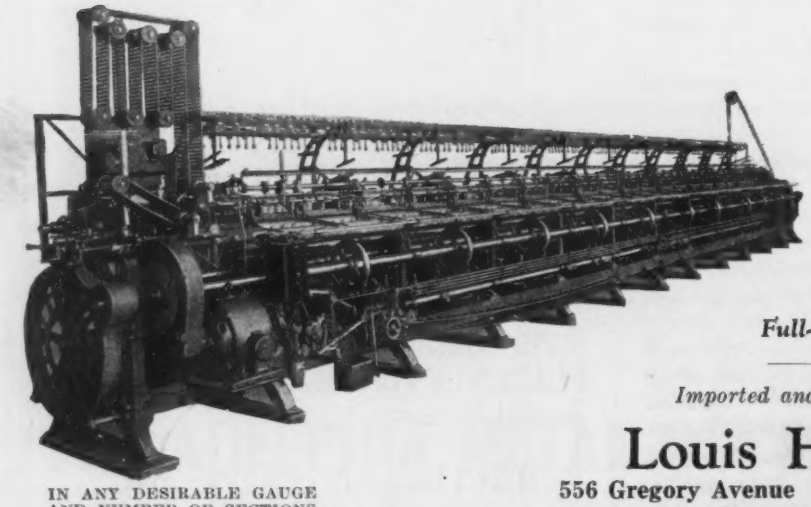

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prices for silk lines. Mercerized hose is doubly beset, on the one side by higher prices for mercerized yarn and on the other by a more advantageous price situation for seamless and full-fashioned silk. More of women's cotton hosiery, including mercerized, was produced in July this year than in the corresponding month of 1926, but there was a severe drop this year from June.

The perhaps more unsatisfactory item in hosiery is infants' socks. Opened early in July for the 1928 season, the sales of lines of most mills in the eight weeks following represented little more than samples, and there had been no great interest manifest by jobbers to the middle of September. Meanwhile mercerized yarns, for the lower price numbers, were scoring new highs for the year. There was not that measure of buying on a rising market that was to be expected. Several chain store organizations were heavy buyers of socks, but jobbers operated in ultra-conservative fashion.

Sock prices have been uniform, which is said to have led some jobbers to infer that manufacturers had some sort of understanding as to maintaining values. The only reason for the prevalence of this view is the fact manufacturers have not engaged in price competition, as was the case in most recent years when business lagged after the opening. However this may be, mercerized socks are worth more money than at the opening and rayon lines are worth fully as much. In view of jobbers' unwillingness to operate in July and August, several important mills were idle at times, two or three having no production during a four-weeks period. It was realized that to anticipate jobbers' selections, in the multiplicity of styles, would be the height of folly. As samples had been made up and details were lacking, there was nothing to do but shut down and wait.

Hose for boys and misses is fairly active, but, aside from popular price golf lines, this item appears a speculative proposition for manufacturers, and not a highly profitable one for those aiming to keep abreast of changes in patterns. Usually, production of any one design is barely sufficient to compensate for changes in machine attachments, in which respect there is said to be plainer sailing for mills operating Jacquard machines. Mills making boys' and misses' lines to sell for a half dollar a pair have for some time been under constant pressure for deliveries. There is also satisfactory business for manufacturers of juvenile sports lines well established among distributors. On the whole, using production, shipments and new orders as an index, the situation in juvenile lines is a healthier one than at the beginning of Fall last year.

Despite complaints of backward business in wool hose and wool in mixture with silk or rayon, shipments give promise of running ahead of last year, in women's and children's, with indications of some decline in men's half-hose. In the last few weeks there developed more interest in men's, however, and manufacturers were in the market for wool in mixture.

The market for men's half-hose appears the more difficult to navigate. It is a question with manufacturers whether to set the helm for another novelty season. Dealers themselves are divided in opinion, many inclining to the belief a middle-of-the-stream course would be the safer one. Less of plain silk is coming out, comparing with recent months and with last year. There prevails a belief, however, that silk socks for men are at the beginning of a comeback. Most all interests have had a surfeit of novel-

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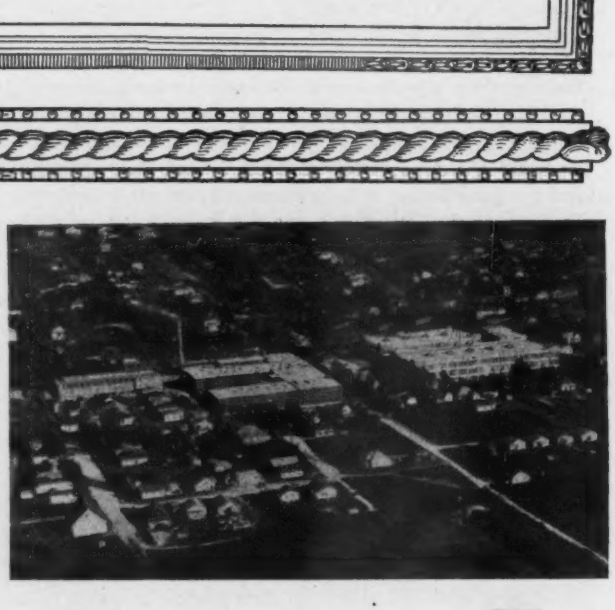

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ties, although they have been the life of the market, until quite recently, when it became less easy to move stocks of even moderate price lines.

One difficulty met by manufacturers is that they get few duplicate orders for any given pattern and cannot begin to figure cost with any degree of accuracy. In this respect they are no worse off than earlier in the year, but there is more hesitancy to float new designs, as the market is over-supplied with what was new a month or more ago but old now. Retailers have had to sacrifice, and necessarily are proceeding with much caution for Fall, as they are expected to do for next Spring. In the circumstance, conditions as to fancy, half-hose may be said to be not so rosy, from the angle of profitability . The outlook depends upon the point of observation.

Hosiers who have acquired the habit of noting hosiery style as expressed in representative gatherings in hotel lobbies agree that under varying circumstance plain colors predominate. Summing up observations made on railroad trains, it appears that in the club cars plain colors lead by a very large majority, in some instances in proportion of eight to two, while just the ordinary cars are used mostly by men who wear pattern socks. Socks of silk plaited on rayon appear to be coming into better call. A mill line in solid colors and having knitted-in clocks is reported a ready seller at $3.25 a dozen to jobbers. A considerable increase in the production of half-hose of this construction is noted. In a general way it compares favorably with straight silk seamless, made with seamed back, costing jobbers $4.25 a dozen.

Whether plain or in stripes and colors, half-hose designed for the popular price brackets finds a ready market. An upstate Pennsylvania mill, for example, is having a steady run on novelties to go over the counter for 25 cents a pair. They supply one reason for the disturbance sustained by the one time popular half-dollar numbers. The Powell Knitting Co., Philadelphia, operating a branch mill in Spartanburg, is officially reported making and shipping more half-hose than in any recent year. The company knits half-hose exclusively and operates a total of almost 1000 machines, some running overtime continuously.

Measured by distribution, there is a good and improving market. Conditions prevailing in the markets are what manufacturers make them, by either curbing production or going ahead full tilt regardless of distributor requirements. A manufacturer making high class goods and selling a nationally known brand to retailers, said the other day, "The curse of the hosiery business is night time production and consequent excess production." For some time, until a half year ago, the plant of this manufacturer, a large one, was being operated on extended schedules. He said, on one occasion, "We feel uncomfortable when we cannot operate day and part night time schedule," which suggests the thought that what may be a "curse" at times may be a blessing sometimes.

Underwear.

The hardest blow to be sustained by late buyers of cotton ribbed underwear for the coming season was reserved until the September 8th cotton report came out. Whether a less than 13,000,000 bale crop was anticipated in price advances made from time to time, or a further markup by mills is imminent, was left to developments. An immediate effect of the revised estimate of cotton yield and the stiff rally on the cotton exchanges was a rush of buyers to increase

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To secure this business, the manufacturer must have equipment that can produce a great variety of styles. The Standard H Knitters with their attachments can produce a practically limitless number of patterns. The pattern shown on the child above was made with the attachment "R," style 5. This produces figured hose of six colors, and permits a change of pattern with surprising ease. No jacks are used. With this machine, cuff tops embodying the same pattern or a striped cuff can be made in the same operation as the leg and foot.

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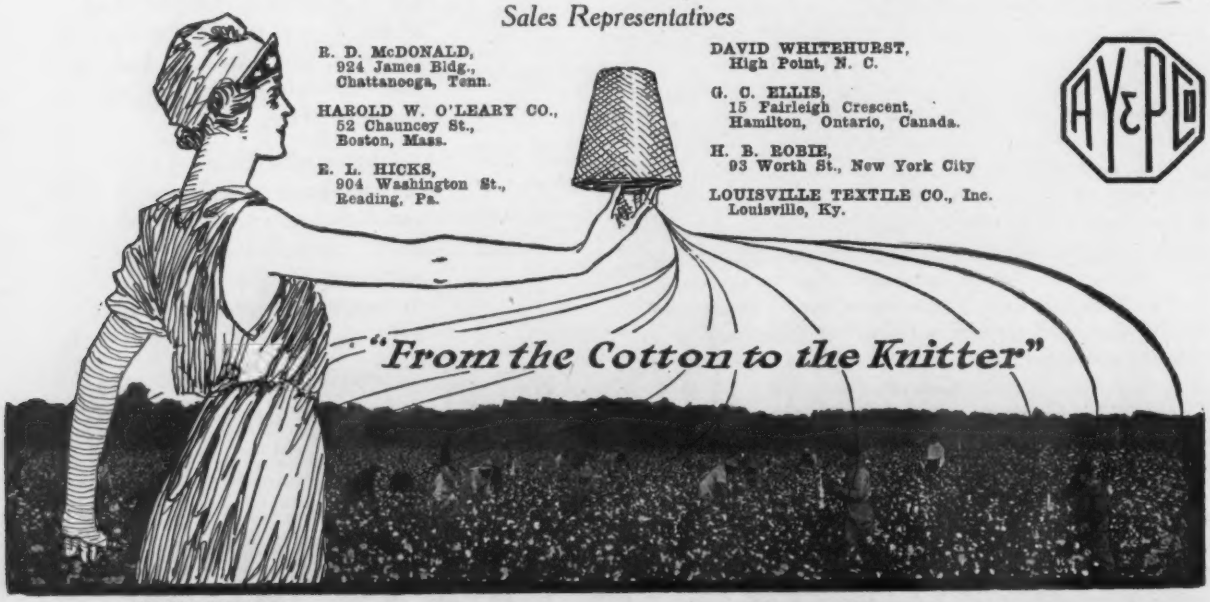

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their commitments and make certain of deliveries against former orders. The market had presented a quiet aspect for several weeks. While activity did not at once become pronounced, safety of orders on the books and a healthier condition for the remainder of the season were viewed as certain.

Educated to buy lightly and as often as necessary, always for quick turnover, retailers who are depending on mills and jobbers to carry ready-to-ship stocks for their convenience will have to add to their contingent expense account a charge for education.

Using a standard line of cotton ribbed union suits for illustrating a point, prices were four times advanced since April 1st, when a markup of 37½ cents was announced, followed by a like increase in June. This was sufficient to warn timid merchants of the danger of further procrastination, but many waited, and late in August there came another revision, of 50 cents. Still a considerable element in distribution waited, and by the 1st of September another half dollar was added, making the total increase in five months 25 per cent. This probably is the most spectacular jump in values since the world war period, and almost parallels in ratio some of the declines that followed the armistice.

There is, necessarily, some confusion over the problematical effect of the present situation on the markets during the late months of the year, the question arising, naturally, will the higher prices retard consumer buying? The answer will depend, of course, on conditions as they prevail generally. Will manufacturers be prepared to meet the November-December demand, or will distributors anticipate demand and relieve the stress that ordinarily is experienced toward the end of the year? The major view of important operators is that the advances announced by manufacturers to the early part of September now look less attractive to distributing interests, but that the retail trade by this time must have reached the conclusion that any further delay may prove as dangerous as was postponement at the beginning of the rise. It is a certainty that if manufacturers deferred with their yarn commitments for the same reasons that actuated distributors and retailers, the year's highest underwear prices yet named will be maintained.

Twice advanced prior to the peak for cotton, fleeced cotton underwear is viewed as likely to undergo no price change. Fleeces have had a desultory market, with no active competition to give it life. It is pointed out that production is not heavy, relatively, and that therefore the more popular lines will move fairly freely on the rise. The position of the mills is materially improved and that of the jobbers by no means jeopardized.

That there has existed much skepticism of a continued rise is shown by concerns which for years have made it a practice to protect their trade against a price decline, while leaving them to go along with the market in the event of a rise. Even where this practice was adhered to this year, it is stated, many jobbers, although they had nothing to lose and all to gain by contracting early, preferred to defer their commitments. The only explanation found for this attitude was a doubt as to whether, if trading proceeded but slowly, manufacturers would not engage in price competition. So, while waiting for cuts, buyers have had to pay advances. This is one year in which history failed to repeat itself in the matter of cut-throat practices in cot-

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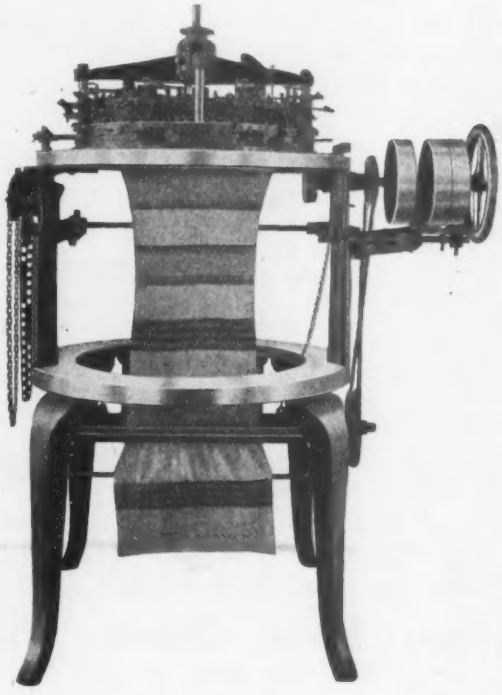

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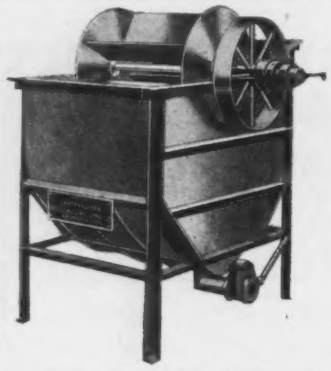

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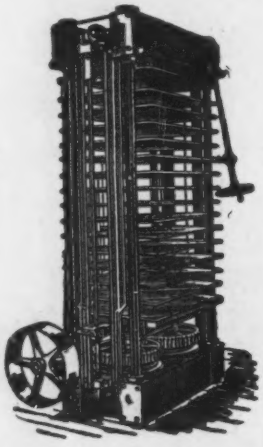

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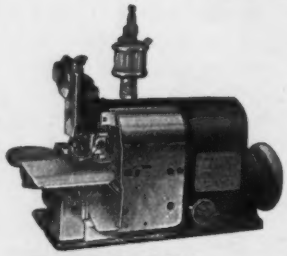

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ton underwear.

In the excitement over progressive advances in heavy weight underwear, light weights were almost lost sight of. Bal briggans have had a short season, with activity cropping out as it advanced, and manufacturers easily maintaining prices higher than at the opening last year. There is reported comparatively light response to mills' offerings for the next season, and it was thought in September that the bulk of the business placed this year for 1928 would be at lower than current quotations. It is pointed out by jobbers who declined to contract at the opening that they would be less disposed now to place forward orders. They cite their 1927 experiences with retailers as indicating that dealers will be tardy next year and that under present conditions there will be hesitancy to guarantee price protection.

Recent developments serve to vindicate those manufacturers who came out in late July with prices for 1928, contrary to the wishes of some of the leaders among them. A few mills booked a moderate amount of business, to their own satisfaction and that of contracting distributors, while those which deferred the formality of an actual opening are none the worse off, so far as relates to the future. Viewed from any angle, the early opening proves to have been no mistake.

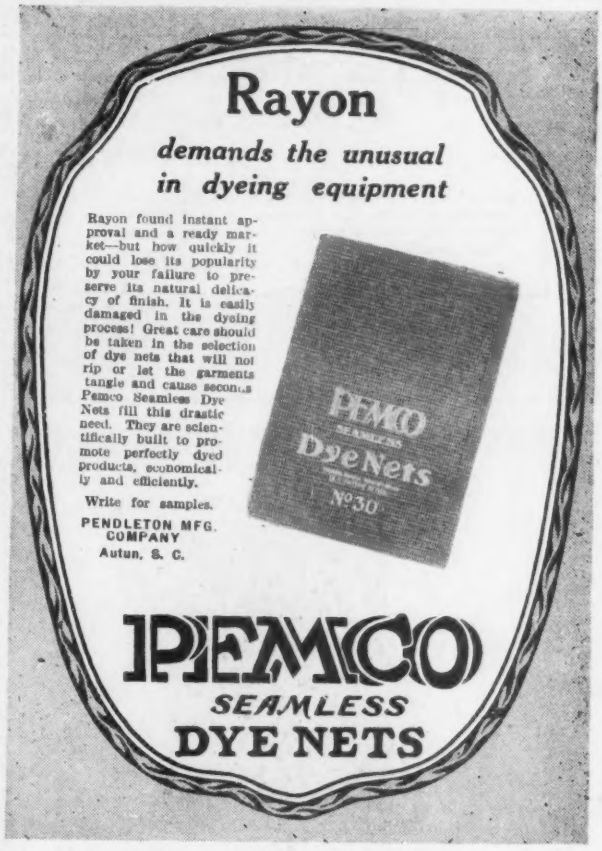
One of the surprsies of the season was the markdown from last year's prices by several leading manufacturers of men's nainsook union suits and kindred cut-and-sewn lines. Particularly was there a drastic reduction by the Sealpax company, who a few weeks ago, however, announced an advance, the first among competitors to make a revision. Nainsook prices still are below the level for this year's distribution on some lines. The situation as to the cut-and-sewn presents no parallel with the knitted, the former being more nearly an all-year-around proposition and assumed to be contracted for on the basis of an average twelve-months staple. Sharper competition between nainsooks and bal briggans is foreseen by manufacturers of the former, and accumulations of stock that are said to exist seem likely to prove a valuable asset to holders.

With no fluctuation in rayon, and silk still cheap, although steadier than for some time, some interests appear to believe that use of women's cotton underwear will not be promoted by the radically higher prices of cotton yarns. Upstate Pennsylvania manufacturers report having taken a fair amount of business in medium weights, but shortly will be in need of more. They look for no materialy lessened demand at higher prices, but are not certain that it may not be more difficult to get early detailed orders. There is little anxiety as to light weights, demand for which seems to have dropped to near zero, and so much machinery scrapped or adapted to other uses that now it is in good call for knitting flimsy cloth.

Several buyers of knitted cloth have been combing the market for sources of supply. One concern was, a few weeks ago, in search of second hand 12 and 14-cut machinery, stating that while there was no difficulty in buying the fabric it could be knitted for quite a bit less than manufacturers were asking for it. The cloth, it is stated, is used extensively for polishing, enormous quantities being bought by several of the large automobile manufacturing companies. It fetches profitable prices in retail stores selling it for household uses.

Sweaters.

The only monotony in the sweater trades is the sameness of the reports of market conditions—all reflecting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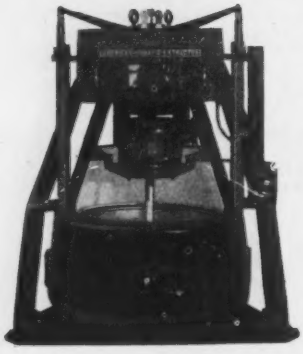

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The Yarns Corporation of America
Forty West Twentieth Street, New York City

JAMES CHITTICK

Consulting Textile Specialist

45 EAST 17th STREET, NEW YORK

Fabrics analyzed. Causes of damages determined. Mills inspected and reported on. Arbitrations conducted. Expert testimony in law suits. Merchandise examined.

TEXTILE QUESTIONS OF EVERY KIND HANDLED
CORRESPONDENCE INVITED

Knit Your Rayon Without Oil
USE
"FIRSCHING"
RAYON YARN CONDITIONER

• • • •

Improve Your Rayon Cloth
USE
"FIRSCHING"
RAYON CLOTH FINISHING MACHINE

J. A. FIRSCHING
614 Broad St., -- Utica, N. Y.

S. L. DIGGLE MANAGER. JOHNSTON BLDG. CHARLOTTE N. C.

ACME
SALES COMPANY

CARDED-COMBED-MERCERIZED
COTTON YARNS

ALL COUNTS AND DESCRIPTIONS FOR THE KNITTING-WEAVING-CONVERTING TRADE

REPRESENTING DIXIE MERCERIZING CO. CHATTANOOGA TENN. LUSTRE

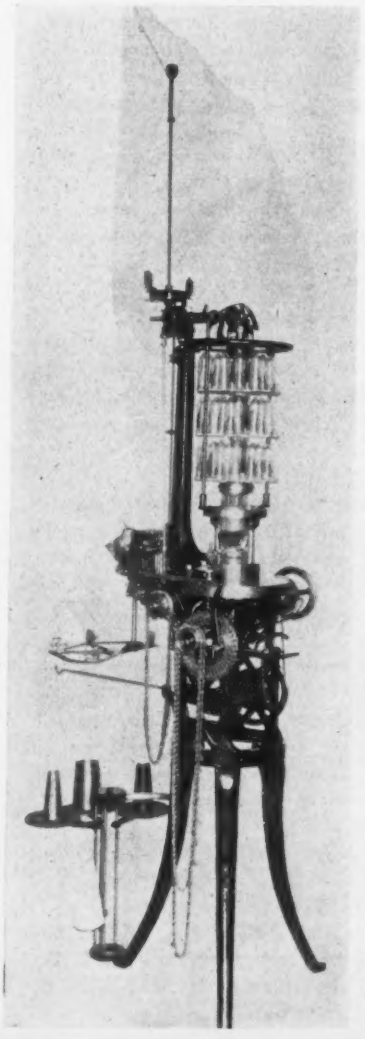
CONTROLLED MANUFACTURE IN NORTH CAROLINA

peak activity and a sold-up condition generally; orders piling up and mills on overtime schedules. Of children's sweaters there is a scarcity. Consumer demand for juvenile coats developed earlier than usual and exceeded all preparations by mills and jobbers. Plain coats for small girls fetch fancy prices, and women's lines at popular prices are not plentiful for immediate delivery, novelties on the conservative order being in especially good call.

Worsted coats on the shaker order, worn by men and women, and designed to go over the counter for $5, constitute perhaps the more active item in sweaters. Of certain distinctive featured lines sold under nationally advertised brands there already is a deficit, making for a better outlet for unidentified mongrel goods. Manufacturers have been favored by a steadiness in worsted yarns, always available during the production season at advantageous prices, but now showing a hardening. Mills using worsted and cotton in combination, for low price coats, say they have difficulty in convincing retailers of the justification for advances and that they therefore are giving little attention to cotton-back coats.

The Fidelity Multi-Design True Rib Machine.

The Fidelity multi-design machine, which is built to produce up to 90 vertical colors and 4 horizontal colors on rib fabrics, is shown in the accompany illustration. When the machine was first developed, it was adaptable only to infants' hose, but now half-hose in all cotton, rayon, silk and wool combinations may be produced, it is stated.



In the head, there is room for 90 fingers placed around the cylinder, each corresponding to one of the 90 bobbins. Each finger originally has ten butts, which may be left in or knocked off, the fingers being grouped to form the desired design. The group of fingers, which then have a pattern on them in butts, is placed in the head of the machine with the butts facing in. Wherever a finger is left out of the circle, no vertical color is plaited over and the basic color therefore shows. A horizontally rotating finger selector strikes

THE ELMORE COMPANY
MERCERIZED
YARNS
Spindale
N.C.

Single Yarns

MERCERIZED

Licensed Manufacturer
TINTED YARNS

Bleached, Dyed, Mercerized
and Glazed Sewing Threads.

THE ELMORE COMPANY
SPINDALE, N. C.

Selling Agents
JOHNSTON MILLS COMPANY
New York: 93 Worth St. Philadelphia: Public Ledger Bldg.
Chattanooga: 805 James Bldg. Charlotte: Johnston Bldg.
READING, PA. CHICAGO, ILL.
Burke County Trust Bldg. 166 W. Jackson Blvd.
CANADIAN REPRESENTATIVE
Slaters, Ltd., 53 Yonge Street, Toronto, 2, Canada

ECONOMY means saving
PROVIDED it is applied right

The EASTWOOD SWISS MOTION
HORIZONTAL WARPER
for Rayon, Silk or Fine Cotton

Saves almost half the time in beaming-off
5½ Meters—6 or 8 yard Reel—Elevation
Irons—Motor or Belt Drive

BENJAMIN EASTWOOD COMPANY
PATERSON, N. J.
Represented in the South by
CAROLINA SPECIALTY CO., CHARLOTTE, N. C.

the fingers, the proper height being secured by the moving of the cam to strike the desired butts, this being controlled by the design pattern chain.

The yarn from the four main bobbins passes to a yarn selector and changer, the yarn changes being made by tying any two ends together, selecting the horizontal colors, from where it passes through a stop motion, over a sweep wire and down to a feed shaft, which is above the 90 vertical color bobbins. It then passes down through a vertical yarn feed tube rotating around the bobbins. This tube and the yoke over the bobbins perform the function of a dogless, also maintaining a constant yarn tension. The yarn then feeds out to the needles.

Each bobbin of the vertical yarn is placed in a small glass cylinder with a conical head, and the bobbin holders are stationary. There is only one moving thread rotating around all the 90 spools.

The loose course plate has a sloping shoulder that slides under the needles, the action being like that of a wedge, eliminating shocks.

With the infinite range of patterns and color combinations, it is pointed out, a vast field of style development is presented.

The machine is made and marketed by the Fidelity Machine Co., Philadelphia, Pa.

Some Knitted Novelties.

A campaign has been started in Paterson and the nearby New Jersey cities for "Silk Stockings for those of the Silk City." This means that the women of this vicinity will buy the products of their own mills, and where manufacturers have not been selling to the local factors a committee is to interview both the producer and seller to know why the goods made in the local mills cannot be handled by the local dealers. Of course, they do not intend to restrict the sales of the merchandise in other places, but they do propose to buy only the goods made in their own city, at least, so far as they can do so. One surprising report furnished a committee of the interested parties was to the effect that the product of only two local hosiery mills could be found in the city. This report so surprised the committee that they have started out to find "why" this condition should exist, and while sales of hosiery are to be on the increase, it is hoped the local mills will report a greater output at the end of the season.

There are many sorts of novelties which are being offered in samples with one of the most sensational of two distinct colors, although it was said by an important factor that bronze and a few of the dark metal shades are likely to be the most active for the fall, midseason and even into spring. Palm Beach novelties are numerous and the "halfway" is one of the most sensational. For instance the lower half of the stocking is one color, such as silver, while the top might be of a tone one could call oxidized. The old gold and bronze are combined, and frequently they are separated by a tiny band of brighter or darker color. If colors are subdued a white, gold, pink or blue band might be used, while the black, brown or gray is frequently noted on the light colors.

Rainbow effects appear to be coming back to favor and it has been said that the scarfs which are being made for the holiday trade featured a number of the rainbow effects in the soft pastel tones, which, at the moment appear to be well liked. Others are showing numerous ombre shadings in the pastel colors, particularly in blue and pink, although a yellow and one shade of light brown was also included in the samples. These include the knitted heavily fringed lines of both the wide and medium length numbers.

A few factors are of the opinion that printed underwear is coming back to favor and some floral prints and jacquards are being tried out by one of the largest producers, although they are doing it in a small way. One very narrow printed border that was shown on a union suit, banded top and bottom and shoulder strap, has been creating some interest, although stocks are to be limited of this type also, believing that the late spring will see more of a demand than for the holiday and Palm Beach trade.

One manufacturer here today said he believed that glove silk dresses for evening would be a good feature for the Palm Beach trade and he is planning to try out some of these numbers in white, pastels, black and a few of the darker shades, with bronze one of those being featured at the close. These dresses will be of straight line, although to show simple draperies where possible, but arranged in such a way as not to bring too much strain on any one place.

Among the Knitting Mills.

It is reported that the Chipman-Burrowes Hosiery Mills, East Flat Rock, N. C., will establish a plant at Asheville, N. C., that will have a daily capacity of 1,000 dozen pairs of hose. V. C. Burrowes is secretary and treasurer.

Virginia Dare Hosiery Company, Elizabeth City, N. C., has been incorporated by H. W. Sanders, W. T. Ward, and D. R. Munn.

Hosiery Corporation of High Point has been formed at High Point, N. C., by Thomas Turner, R. D. Denning, and G. B. Miller. The capital is $100,000.

The May Hosiery Mills and the National Dye Works, Burlington, N. C., have been formally consolidated.

The plans of the Dobson-Miller Corporation, Pulaski, Va., include the erection of a 100x80 foot, modern mill daylight construction building, with additional buildings for dyehouse and boiler. A general line of hosiery, in cotton, silk and combinations, will be manufactured. J. C. Dobson is president and general manager.

Welborn Mills, Inc., Lexington, N. C., recently organized by H. G. Welborn, secretary, and others, will erect a 50x60 foot building, of brick, steel and glass construction, where men's and boys' novelty hose will be manufactured. Ten knitting machines will be included in the initial installation.

Willis Hosiery Mills, Concord, N. C., have been incorporated. E. K. Willis, of Concord, and E. W. Freeze and R. R. Ragan, of High Point, are among the incorporators. The company has taken over the Hoover Hosiery Co.

Artus Knitting Mills, Bristol, Va., have been incorporated by W. R. Baldwin, of the Elk Mills, and J. Wesley Querns of Bristol.

S. S. Miller Hosiery Mills, Reading, Pa., have established a branch plant on men's hose at Rural Retreat, Va.

Randolph Silk Hosiery Mills, Asheboro, N. C., have been incorporated with a capital of $400,000. Full-fashioned hosiery will be produced. The incorporators are D. B. McCrary, W. J. Armfield, Jr., Hugh Parks, K. Alexander and C. W. McCrary.

With the Publishers

Saved By a Human Chain

"Saved in spite of himself from the brink of the falls,———is today in the hospital, after being taken out of the river, just at the crest, by a human chain formed of four men."

Thus begins a dispatch from Niagara Falls to a Toronto paper.

Few forms of rescue are more dramatic, more thrilling than the human chain, where one man grasps the feet of another whose hands are grasping the feet of still another and so on until the perishing man is reached.

There are human chains, too, in the textile field. The men they rescue or the mills they save may not be on the brink of the falls, but it is certain that the human chains, working through the pages of COTTON, have pulled back mills that were drifting in the dangerous channels of high costs, poor work, or low production.

Every time that a mill superintendent, whose plant contains a problem, picks up a copy of COTTON and sees how another superintendent has overcome a similar operating difficulty the human chain is at work. Just how long this chain is and how many men it includes cannot always be told. But there are generally three important links in it at least—the man who worked out the problem, the maker of the equipment that helped solve the problem and some member of the editorial staff of COTTON who induced the man who worked out the problem to tell the rest of the textile field how some other mill may be aided or improved.

Each link in the chain is equally important.

Sometimes a mill superintendent is "saved in spite of himself" just as was the man in the dispatch. Although the mill man is not a "would-be suicide"; he may not be aware that his industrial craft has gotten into a channel that flows swiftly toward disaster. The informative articles in COTTON frequently serve to sound warnings of danger, as well as to offer assistance, to those mill men who know that they are nearer to the edge than they like to be.

This is not an attempt upon the part of the publishers to glorify, in any degree, the work COTTON is doing. It is rather an effort to emphasize the helpful spirit that it finds among the leaders in the textile industry. Such leaders do not hesitate to make themselves part of a human chain and lend assistance to struggling fellow-workers.

Only the other day a supply salesman told a mill man about a nearby mill where they were having a trouble that had been overcome in the first mill. "But," he added, "I wouldn't tell them what you did because it didn't seem just right to do so." Then the mill man told him positively that he would be glad to have them told about it, or any one else, because, he contended, "A man should be willing to help the other fellow in every possible way."

If all the rescues that have been effected by the makers of the equipment and supplies which are advertised in COTTON could be told in full, they would reveal an interesting history of game fights in the textile field. These essentials of the industry have proved to be life-savers time and time again.

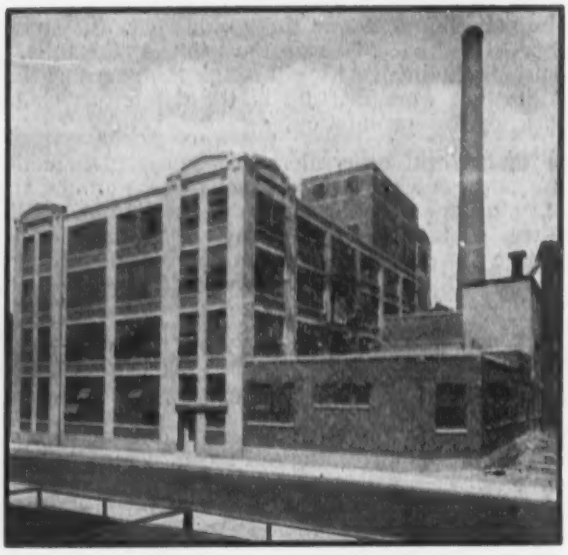
Truly an industry as gigantic as this one has its perils and its catastrophes, and COTTON is glad that it is able to play an important part in lessening the casualty list and in giving a helping hand wherever and whenever possible.

Whenever in trouble, write the editorial department of COTTON. They may be able to help.

How will your new plant be built—

The Old Way . . . or The New?

THE OLD WAY is to let the job, either yourself or through an architect, to a general contractor and various subcontractors. One is responsible for the excavating, another for masonry, another for steel work, another for carpentry, and so on ad infinitum. Result — division of responsibility, disputes, delays, overlappings, several profits.



THE NEW WAY is the Austin Method of Undivided Responsibility. One contract covering design, construction and equipment. Total cost for the complete project guaranteed in advance. Completion date guaranteed with bonus and penalty clause if preferred. Guaranteed quality of materials and workmanship.

A combined building service with but a single profit

Wire, phone the nearest office, or write (use the coupon if you prefer) for more information. Austin will gladly furnish approximate costs and valuable data quickly, on building projects of any size.

THE AUSTIN METHOD

THE AUSTIN COMPANY *Engineers and Builders* Cleveland

New York Cleveland Chicago Detroit Pittsburgh Philadelphia St. Louis Seattle Portland Miami

The Austin Company of California: Los Angeles and San Francisco The Austin Company of Texas: Dallas

THE AUSTIN COMPANY, Cleveland

We are interested in the erection of a_____

_____ Building

_____ x _____, number of stories_____

You may send me a personal copy of "The Austin Book of Buildings," free to Industrial Executives.

Firm _____

Individual _____

Address _____

AUSTIN

Complete Building Service

C 11-16

AMONG COTTON'S READERS

Paul A. Schulz, President,

The Absorbent Cotton Co. of America,

Valley Park, Missouri

"I have always been interested in COTTON, for which I have subscribed for a good many years. I enjoy reading it every month, but now I have to take a little more time to read it as it is really a book now instead of a magazine. I remember the time when it had 20 pages instead of 204."

Paul A. Schulz

NATIONAL SOLANTINE PINK 4 BL

A new fast-to-light product for cotton in all stages of manufacture, particularly desirable when delicate tones are required.

Useful for union dyeing, leaving animal fibres practically unstained.

Of excellent solubility and level dyeing.

Discharges clear with hydrosulfite.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

AMONG COTTON'S READERS

P. E. Glenn, Secretary-Treasurer,
Exposition Cotton Mills,
Atlanta, Georgia.

"The keen interest on the part of the editors of COTTON in the success of the entire southern textile industry, their zeal and energy in getting out a magazine of valuable information, interestingly presented, make COTTON an outstanding trade journal greatly appreciated by all cotton mill executives.

"I have read it monthly for more than seventeen years."

P. E. Glenn

NATIONAL COÖPERATION

CONSTANT improvements being made in textile dyeing processes frequently call for decided modifications in the method of applying dyes.

The National has on its staff experienced technical men who are advisory experts and dependable for assistance in solving dyehouse problems. They are at all times prepared to cooperate with dyers in the production of standard or mode shades where new equipment is installed.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

NATIONAL N DYES

With the Publishers—

No Two Shoulders Carry Identical Loads

"He seeith not the principle of adaptation."

This text was used not long ago by S. Roland Hall for a sermon in Printers' Ink on the principle of adaptation which he declared was "one of the most important principles of business and one that is little understood."

In the course of his preachment he referred to the fact that "hundreds of subscriptions to valuable business magazines are cancelled" because the one-time subscribers had not found in the pages articles or plans which they could adopt in their entirety.

"Business men today are usually receptive to good ideas, but all too frequently they want something they can **adopt** rather than something they can **adapt.** There's a difference of just one letter in the two words but that seems almost an ocean-wide difference—to many men."

It is seldom that two textile mills have **identically** the same problems. One superintendent may be bothered by a dozen different things. No other superintendent may be carrying the same twelve on his shoulders. But a man here may have one of the same problems, and a man there another, and still another. If the superintendent reads the editorial material in COTTON regularly, he is likely to find that in due course of time, each of his worries has been successfully tackled by some other mill man.

That's why COTTON devotes so much effort to putting on record the practices in different mills in the "How Other Men Manage" department.

"According to psychology, there is an element of laziness in all human beings," said Mr. Hall. "It is, of course, much easier to go to some record, printed or otherwise, and pick out suggestions and figures that apply directly, without change, to our own enterprises.

"Maybe, though, our brains would move in ruts and become atrophied if we didn't, as a habit, apply the principle of adaptation and while taking a lesson from what others have done, do the thing a little better in our own experience."

Mill superintendents who get the most value from their subscriptions to COTTON guard against the human "element of laziness" by reading the advertising pages. There is a world of valuable material there, but it isn't always tailored exactly to fit every superintendent's problem. However, in many cases only a slight alteration is needed.

What the other fellow has done with advertised machinery or supplies, or what the advertiser tells about its performance is a good starting point for thinking how it can be **adapted** to your own needs. All these products are the result of experience. And as Mr. Hall stresses:

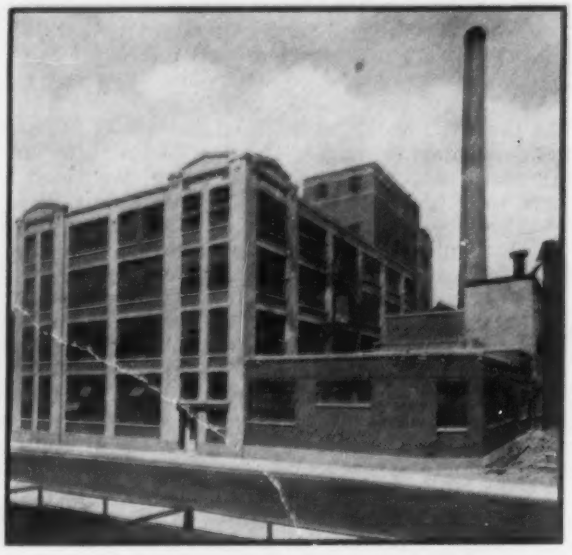
"All Experience is a great teacher, but there are two kinds of experience—our own and the experience of other men. We owe it to our own progress to take all we can from the experience of other people."

On the other hand the system of the Golden Rule works as well here as elsewhere in life and we should always be willing to reciprocate by telling of our own experience and how certain definite problems were met and overcome. We may think the other man is not interested, but COTTON reaches over 8000 other men in textile work and, as pointed out earlier, the wise reader "adapts" such experience to his own mill and to his own conditions.

Today is a good day to begin to take part in these discussions. Write a letter to COTTON and tell your angle on some problem or experience. Your letter will be acknowledged in true COTTON style.

You May Not Want These Things—

When you build your new plant, speed in completion may not be important to you. Low cost may not be a prime consideration. Guaranteed quality of materials and workmanship may not worry you——but if you do want these things, Austin can give them to you. Here's how:



In advance, Austin guarantees the total cost for the complete project; also the completion date, with bonus and penalty clause if preferred; as well as quality of materials and workmanship.

Under the Austin Method of Undivided Responsibility, one contract covers the complete project—engineering, building, and equipment.

A permanent nation-wide organization trained in the Austin Method, vast experience and data, and extraordinary facilities make possible the amazing speed in design and construction for which Austin is famous, together with the lowest cost consistent with high standards of quality.

That is what has won leadership for Austin in the industrial building field, and the deserved confidence that results in many repeat contracts. If these things appeal to you, wire, phone or send the coupon for valuable building data.

Approximate costs on a project of any size will be furnished gladly, without obligation. Don't wait until spring if you need new plant facilities—Austin can furnish them now.

THE AUSTIN COMPANY *Engineers and Builders* **Cleveland**

New York, Cleveland, Philadelphia, Seattle, Chicago, Detroit, Portland, Miami, Pittsburgh, St. Louis
The Austin Company of California: Los Angeles and San Francisco. The Austin Company of Texas: Dallas

THE AUSTIN COMPANY, Cleveland
We are interested in the erection of a _____
_____ Building
_____ x _____, number of stories _____
You may send me a personal copy of "The Austin Book of Buildings," free to Industrial Executives.
Firm _____
Individual _____
Address _____
C-1-27

AUSTIN
Complete Building Service

AMONG COTTON'S READERS

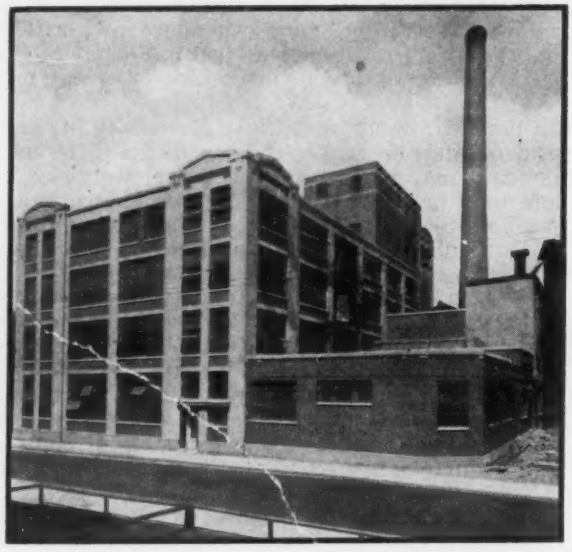
J. T. Phillips, Superintendent,
Buck Creek Cotton Mills
Siluria, Alabama.

"I consider COTTON one of the very best publications covering the cotton manufacturing industry today. I look forward to each issue of COTTON and enjoy reading it very much."

J. T. Phillips

You May Not Want These Things—

When you build your new plant, speed in completion may not be important to you. Low cost may not be a prime consideration. Guaranteed quality of materials and workmanship may not worry you——but if you do want these things, Austin can give them to you. Here's how:



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"I consider COTTON one of the very best publications covering the cotton manufacturing industry today. I look forward to each issue of COTTON and enjoy reading it very much."

J. T. Phillips

NATIONAL SULFUR BROWN R

AN addition to our line of Sulfur Browns. Of excellent solubility, and good fastness to both washing and light, especially when after-treated with copper.

Recommended as a self color or in combination for ginghams, shirtings, and similar fabrics.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

With the Publishers—

Exposing Operating Executives to Stimulating Ideas.

"Do you know that your mind is not equipped with a self-starter; that it must be cranked before it will act?", asked Dr. James J. Walsh, in the Popular Science Monthly.

Yes—we're going to suggest the value of COTTON for getting the minds of mill superintendents—and others in the textile field, too—under way so that they and the industry will get somewhere.

"The brain cannot spin out thought of itself; it will act only in response to some external impetus, something which the senses perceive," says Doctor Walsh. " . . . . . Far too many of us go through life virtually letting our reflex actions take care of us. We act only in response to the stimulus of necessity. We never consciously seek a stimulus that will stir our minds into action, carrying us on to the heights of achievement where stand those whose success we envy and, excusing our own laziness and lethargy, attribute to luck."

But not everybody spends their time in idle envy. Once they become interested in a thing and understand a little about it they want to learn more and do more. A trade paper like COTTON is published for the purpose of interesting all classes of executives in the textile field and helping them to understand it better. That is the aim of both the editors and the advertisers.

How external stimulus by means of the trade paper is applied in some other fields may prove stimulating to textile executives.

"Alexander B. Greenleaf, who is connected with the industrial sales department of the People's Gas Light & Coke Company of Chicago, stopped in at the office for a few minutes and during the course of his visit mentioned that it was a policy of his company to pay half of the subscription price of any business paper to which any of its employees wished to subscribe personally," said Advertising Fortnightly.

"This is an idea that many other concerns might adopt. By sharing the cost of the subscription, the company established its interest in its employees; while the requirement that the employee pay half insures that he or she will not take the subscription as a matter of course, but will look upon the publication as in the nature of a personal investment and treat it as such."

Some authorities on business methods believe that the idea of having each executive get a copy of an authoritative paper is superior to having a single copy routed through the office, even if certain articles are marked for the attention of particular individuals. If some person does the reading for the entire office, J. George Frederick, in Office Economist recommends getting several copies of each periodical and **tearing out** the articles which are sent to each executive.

But there is nothing like letting each individual cultivate the habit of discovering for himself adaptable ideas in trade papers like COTTON. If a sub-foreman uncovers such an idea and figures out a way to adapt it in his own department or work, he feels a proprietary interest in that idea. He brings this suggestion to the attention of his immediate superior with a certain amount of pride. If it is adopted and proves successful, then several things happen: He is recognized as a thinker, a man with an interest in his job; he is placed on the priority list for advancement in position and pay; and finally this recognition encourages him to keep on thinking about his work in order to study out some further means of improvement.

A proposition of this character pays dividends all around. It pays the sub-foreman who reads and thinks. It pays the executive who initiates this reading and thinking. And it pays the stockholders who keep this type of an executive at the head of the business.

To the Directors of Corporations—

WHEN you are thinking of new buildings—a complete plant, additions, or branch plants—Austin will be glad to furnish you with sketches, specific information and approximate costs promptly, whether your annual meeting is 2 days or 2 weeks hence.

No matter where you are located, Austin's nation-wide organization offers this service for your proposed buildings of any size, single or multistory, involving 25,000 or 500,000 sq. ft. No obligation, of course.

The Austin Method of Undivided Responsibility relieves the owner of all detail, and centers the entire obligation to Design, Build and Equip, within the Austin Organization trained through more than a half-century of successful building experience.

Austin guarantees total cost, completion date with bonus and penalty clause if preferred, and quality of materials and workmanship. Austin gives Big Business the maximum value per dollar invested.

Just sign and return the Memo below; or phone, or write.

THE AUSTIN COMPANY, *Engineers and Builders,* Cleveland

New York Cleveland Chicago Detroit Pittsburgh Philadelphia St. Louis Seattle Portland Miami
The Austin Company of Texas: Dallas The Austin Company of California: Los Angeles and San Francisco

AUSTIN

Complete Building Service

Memo to THE AUSTIN COMPANY, *Cleveland:*— C-2-27

We are interested in quick delivery of a _____ project containing _____ square feet. You may send a personal copy of "The Austin Book of Buildings."

Firm _____

Individual _____

Street _____ City _____

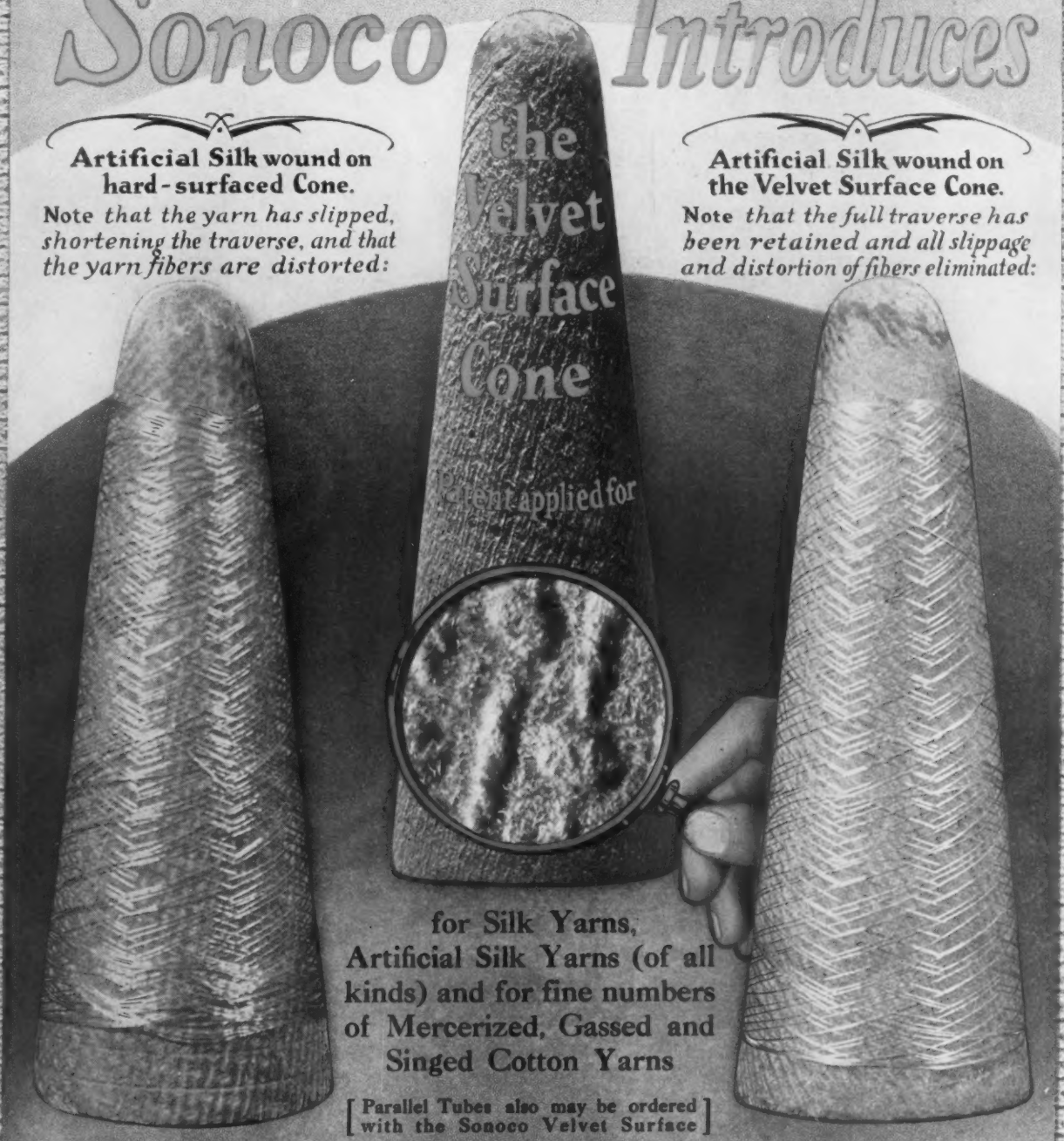
"Sonoco" Introduces

Artificial Silk wound on hard-surfaced Cone.

Note *that the yarn has slipped, shortening the traverse, and that the yarn fibers are distorted:*

Artificial Silk wound on the Velvet Surface Cone.

Note *that the full traverse has been retained and all slippage and distortion of fibers eliminated:*



for Silk Yarns, Artificial Silk Yarns (of all kinds) and for fine numbers of Mercerized, Gassed and Singed Cotton Yarns

[Parallel Tubes also may be ordered with the Sonoco Velvet Surface]

On the Velvet Surface Sonoco Cone the yarn lies in perfect position in the primary winding and assures a better delivery of the yarn, with minimum of waste. The converter and the knitter will both appreciate this.

SONOCO PRODUCTS CO., Mfrs.

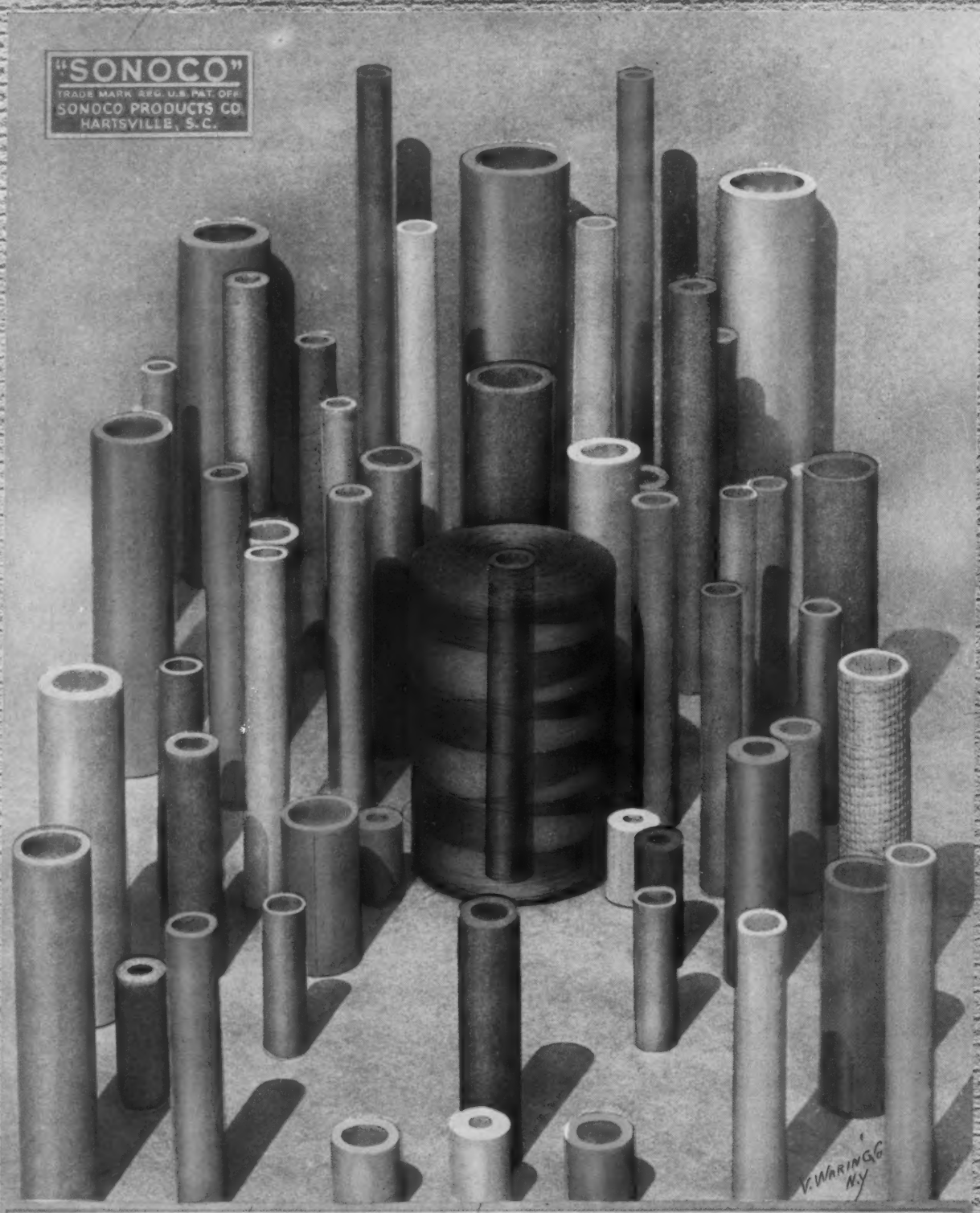
CONES, TUBES AND CLOTH-WINDING CORES

512 BOOK STORE BLDG.
NEW BEDFORD, MASS.

MAIN OFFICE AND FACTORY
Hartsville, S. C.

W. J. WESTAWAY CO., Ltd.
HAMILTON, ONT.

V. Waring Co. N.Y.



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MAIN OFFICE AND FACTORY
Hartsville, S. C.

W. J. WESTAWAY CO., Ltd.
HAMILTON, ONT.

AMONG COTTON'S READERS

Frank S. Dennis
Division Manager and Superintendent, Union Division, Consolidated Textile Corporation, LaFayette, Georgia.
Vice-President, The Arkwrights, Inc., Vice General Chairman, Textile Operating Executives of Georgia.

"I always look forward to the receipt of my copy of COTTON and consider it a publication of the highest rank. Its pages contain much useful information for mill executives. I wish to compliment you particularly on your accuracy in reporting the discussion meetings that are held at various times."

Frank S. Dennis

NATIONAL SULFUR BROWN R

AN addition to our line of Sulfur Browns. Of excellent solubility, and good fastness to both washing and light, especially when after-treated with copper.

Recommended as a self color or in combination for ginghams, shirtings, and similar fabrics.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

With the Publishers—

"Select Your Exit, Then Walk, Don't Run."

"Look around you, find the nearest exit, and in case of fire, walk, don't run."

You've seen it often on the program at the theater. It's a warning not to lose your head in an emergency. Study the way out in advance. You may never have to use the emergency exits but it's a good thing to know where they are.

Did you ever consider the advertisements of equipment and supplies that appear in COTTON in the same light? You may be confronted with an emergency or situation some time that now seems impossible. Wouldn't it be an excellent thing to know how to find your way out in the dark; when it seems, in a sense, that the lights of successful mill operation are going out?

The whole matter of fire fighting and fire prevention in these days contains many situations that are parallel to the textile industry. Fire chiefs and other fire fighters are constantly studying to devise more efficient methods. Even though they are less picturesque these new methods usually are more effective.

We all regret the passing of the wonderful horses that used to race with the apparatus down the street, but they had to give way to the speedier internal combustion engine. Inasmuch as one change breeds another the advent of the motor-drawn apparatus made two other sweeping changes.

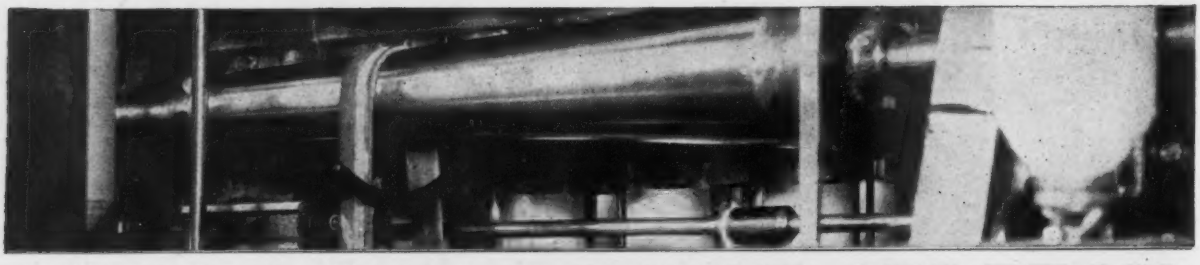
Because the stables on the first floor are gone, it is no longer necessary for the sleeping quarters of the firemen to be on the second floor, and in many cities the one-story bungalow type of firehouse is replacing the old structure. With this change goes another exciting thing about the firehouse—the shining brass pole down which the men used to slide when an alarm was turned in.

All this is because time is the all-important factor in keeping down fire-losses. Time is also a big factor in keeping down industrial losses. That's why makers of textile equipment and supplies advertise regularly in COTTON.

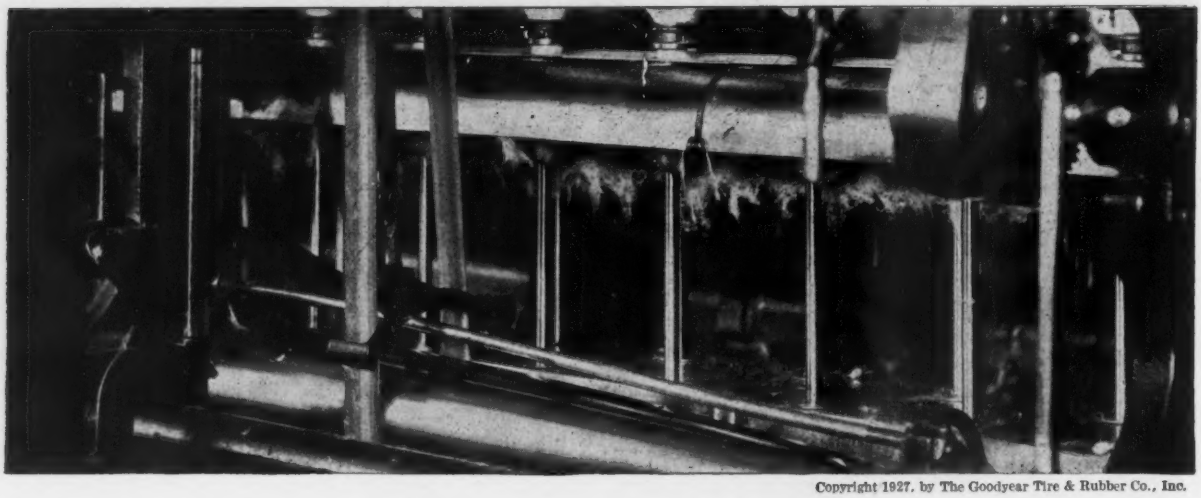
Each advertisement in COTTON is an exit for the mill man when an emergency comes. Safety lies, so the theater and fire bureaus have found, in instilling into people the habit of locating the nearest exit before it is needed.

Look around you now, among the advertisements, and you will find many openings that may be useful in the future. It costs you little to look; just a small expenditure of time and energy. It may cost you a great deal not to look.

Think it over from that viewpoint.



BELTS THAT DO NOT STRETCH



Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

You get better service, longer wear, and the kind of performance that assists in the production of yarn free from knots, snarls and piecing, when you use Goodyear Cord Cone Belts on your slubbers, jack frames, intermediates and fine frame drives

---

Goodyear Cord Cone Belts do not break or stretch.

They are specially made to hold the cones and the pulleys in a flexible, slipless grip.

Their efficient, economical service is a result of correct design and special Goodyear construction.

Goodyear Cord Cone Belts are designed especially for the duty required of them, and built according to specifications determined by analysis of the textile industry.

They are made in sizes to fit all standard machines.

For typical service records or for any other information about these belts, address Goodyear, Akron, Ohio, or Los Angeles, California.

Goodyear Means Good Wear

GOODYEAR

AMONG COTTON'S READERS

Lester J. Hill, Superintendent
Shoaf-Sink Hosiery Mill Co.
Lexington, North Carolina

"I wish to take this opportunity to express my appreciation for the 'Knitting Kinks' section in COTTON. It is with genuine interest that I read it each month. It is becoming more and more interesting as it deals with subjects that are of vital importance to hosiery mills. I feel that the technical points that are discussed in its pages make each issue worth more than the price paid for a whole year's subscription."

Lester J. Hill

NATIONAL ERIE CATECHINE G CONC.

THIS is a new Direct Dye producing shades between National Erie Catechine 3G and National Erie Catechine B.

Especially recommended for mode shades, and where fastness to washing is a consideration. Useful for jig and pad dyeing, and also for speck dyeing on account of having good cold dyeing properties.

Samples together with full technical directions are available at any of the National's Branches.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

NATIONAL N DYES

With the Publishers—

Hanging Up the "Tell-Tale" Ropes of Experience

"Oh, Mamma! What's that fringe hanging over the railroad track," asked a little girl of her mother as they were out walking.

"That's what they call a 'tell-tale'," replied her mother.

"You see how a long rope is stretched across the track and a lot of shorter ropes dangle from it?

"Now do you see down the street where another railroad crosses this one—this one runs under a bridge? If a brakeman were standing on top of a high freight car that bridge would sweep him off and he would be killed or badly hurt.

"But the tell-tale warns him even if he doesn't see the danger. He may not know he is so close or may have his back turned, but at least one of these dangling ropes will strike him and give him warning in plenty of time so that he can get down on the top of the car. Many lives are saved in that way."

Operating a textile mill today isn't a care-free journey. There are many places on the industrial road where a mill superintendent or department head could be swept off his feet and killed professionally. Even where the danger is not so great he can suffer some humiliation and mighty bad bumps.

Any operating executive who is riding on COTTON'S train—reading the paper each month—and out ready to apply the brakes, will find plenty of "tell-tales" to warn him of the dangerous spots.

Here and there we find in mill operation perilous crossings and overhanging obstacles that have endangered other men. By descriptive experiences recited in COTTON these are marked; we dangle the ropes of experience to let others know just about where to look for the things that have swept some men from their feet. Superintendents are thus reminded that they must exercise caution.

The low-bridge of inferior products, the chute projecting from lessened output and the spout of excessive waste must all be marked.

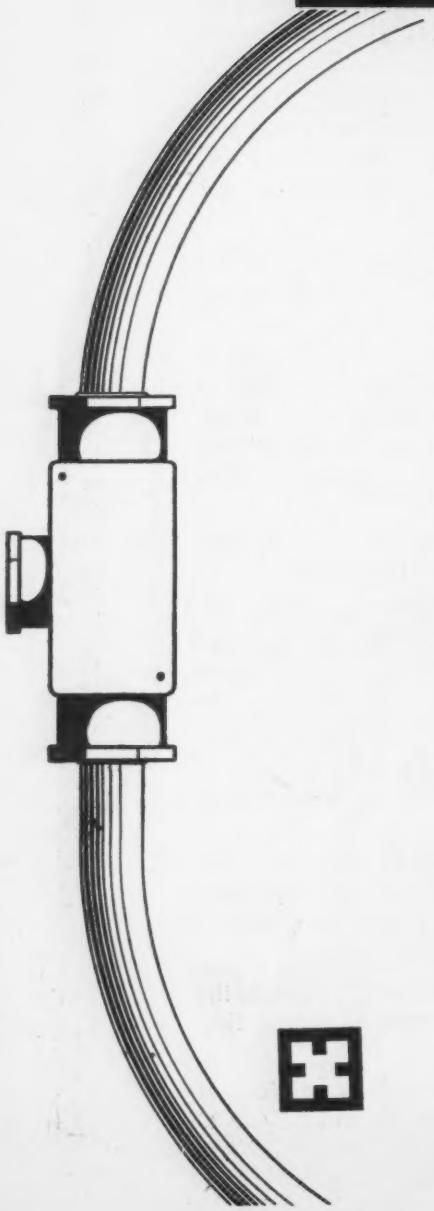
Some of the "tell-tales" stretching across this right of way of the textile industry have been installed by manufacturers of equipment and supplies. In the advertising pages of COTTON you will find many signals that will prevent you from getting a bad bump. These manufacturers are aware that operating executives do not always know what lies just ahead, even if they plan to keep a sharp lookout.

And so they too hang up the ropes of experience on their division of the road.

Almost every day some regular reader writes in to our editors expressing appreciation for some help received, directly or indirectly, through the pages of COTTON. One man describes it as a university of practice and a text book combined.

Then there are those who write and request "Old Timer" to dangle the ropes of his personal experience over some branch road they find they are going to have to travel.

Our editors try to keep COTTON interesting as well as helpful. If you are finding it useful in your work, why not pass the word along to your friends in the textile game. We would like to serve them too. Then **you** would be helping by hanging up the ropes of **your** experience.



Time Savers—Both

Through the dim reaches of the night ride Uncle Sam's air mail carriers. The elements matter little to these men of heroic mould. ***Time must be conserved.*** It is—to the nth degree.

On every hand Father Time is waging a losing battle. Of vital importance to mill men is the recently developed KONDU-BOX—a time saver of the first magnitude.

This threadless KONDU fitting cuts labor costs tremendously because it totally eliminates thread cutting. Conduit installation is made simple no matter what the layout encountered. You can bend the conduit to any shape desired. Posts, beams, etc., cease to be factors. You simply cut off the right length of conduit, ream off burr inside, set into bushing and tighten with lock-nut. Every KONDU fitting is a union in itself. It may be easily removed and replaced in the line.

When your next electrical construction job comes along —specify KONDU-BOX. As a preliminary, write ***now*** for sample fitting and catalog.

ERIE MALLEABLE IRON CO.

KONDU DIVISION *ERIE, PENNA.*

District Offices

New York
Philadelphia
Pittsburgh
Chicago
Cincinnati

J. G. Pomeroy Co., Los Angeles and San Francisco, Cal.

C. R. Dederick, Portland, Ore. and Seattle, Wash.

Fred E. Staible Denver, Colo., and Salt Lake City, Utah

E. E. Dawes, Atlanta, Ga.

Boston
Cleveland
Detroit
St. Louis
Kansas City
Baltimore

KONDU THREADLESS FITTINGS

AMONG COTTON'S READERS

J. O. Edwards, Superintendent,
Icemorlee Cotton Mills, Inc.,
Monroe, N. C.

"You have a wonderful magazine and one which I feel is doing a great good in the textile industry. I like to read COTTON for the good I get out of it. Every issue is filled with helpful ideas."

J. O. Edwards

NATIONAL ERIE CATECHINE G CONC.

THIS is a new Direct Dye producing shades between National Erie Catechine 3G and National Erie Catechine B.

Especially recommended for mode shades, and where fastness to washing is a consideration. Useful for jig and pad dyeing, and also for speck dyeing on account of having good cold dyeing properties.

Samples together with full technical directions are available at any of the National's Branches.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

NATIONAL N DYES

With the Publishers—

The Mill Man Who Wasn't "Rarin' to Go."

Somebody had remarked, despite the good time they had made in reaching the mill, that Brown, the superintendent, had shown that he was a careful driver.

"He follows the same principle in his business," spoke up a supply salesman. "He approaches crossings cautiously and makes sure that the traffic signal light is going to be in his favor before he tries it. If the driver ahead of him puts out his hand for a turn or a stop, Brown prepares to change his own driving.

"He's the same way about making any changes at the mill. He's got to be sure he's got a clear road ahead before he puts in any new stuff. And he generally has a pretty fair idea of where the other fellows are heading.

"You don't find Brown 'rarin' to go!'"

"Not long ago, J. George Frederick was discussing, in The Office Economist, the passing of the type of business and technical man who had been inclined to "make a rough guess and 'go to it.'"

He pointed out how this type "has had his ego very severely bumped in the last ten or fifteen years" and has "come a cropper" because his competitors secured more information before acting.

One reason he gave is significant:

"Nowadays, trade paper and business periodical material is important to make use of, for business journalism is on a much higher plane than ever, and material of real value is constantly appearing—and should be quickly assimilated by the proper executives."

Such "material of real value" is constantly appearing in COTTON—material that enables operating executives to meet unexpected swings of production and to solve problems of operation that suddenly loom large.

We do not consider simply the editorial material, but include the advertising pages as educational too. Hints in the paid space of the makers of machinery and supplies often give an idea of from what direction the "monkey wrenches" that are slowing up the works are coming."

In contrast with the old type business man, Mr. Frederick cited the growing number of those who are "much more humble and more ready to concede the need of securing information before acting . . . "

"I recall that the president of a company in conference remarked that it was a certain competitor's new policy to do thus and so, and the sales manager contradicted him and said its policy was something different. The president gave him a long look. 'Joe,' he said with serious disapproval in his voice, 'the ——— Magazine a month ago told all about the new policy. Apparently you do not keep up with even what our competitors are willing to tell everybody.' Joe never recovered from this blow to his prestige."

For several years past COTTON has published each month a page entitled "Among Cotton's Readers." On this page well known mill executives have told and are still telling why they read COTTON and what they find in it. Their expressed opinions fully bear out the conclusions of Mr. Frederick as previously quoted.

Light Your Way Out of Low Production!

RLM Reflector Socket

Seamless, one-piece porcelain enameled reflector, with two-piece, easy-to-wire porcelain socket. May be furnished with straight-down, inside pull-chain, shock-absorbing socket or theft-proof locking socket.

FROM cotton weaving to cutting up logs; from box-making to knitting lace handkerchiefs; from bright grinding piston rings to the casting box in a foundry—good lighting is having a profit effect on production.

The basic principles of good lighting are the same, no matter what the industry—and in the Benjamin line of industrial lighting equipment will be found the design and construction that are just right for the job.

Send for Our New Book—"Light and Its Effect on Production"

This little book gives you a score or more of vivid stories of how industrial plants of every kind have lighted their way out of low production. Ask our nearest office.

Benjamin Electric Mfg. Co.
120-128 S. Sangamon Street
Chicago

New York
247 W. 17th Street

San Francisco
448 Bryant Street

Manufactured in Canada by Benjamin Electric Mfg. Co. of Canada, Ltd., Toronto, Ontario

AMONG COTTON'S READERS

G. R. Brook, Superintendent,
The Mary-Leila Cotton Mills,
Greensboro, Georgia

"I have been a constant reader of COTTON for years, and consider it the best and most essential textile magazine published."

G. R. Brook

National Erie Fast Rubine B Conc.

A NEW Direct Dye possessing properties similar to, but producing much bluer tones than National Erie Fast Scarlet 8 BA. Adapted for application in all types of machines on account of its good solubility and inertness to metals.

Particularly recommended for unions, dyeing the cotton almost to the exclusion of the animal fibres, and in a soap-soda ash bath leaving silk entirely unstained. Excellent dischargeability with hydrosulfite.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

With the Publishers—

Skullcrackers

A textile man, making his first visit to a big steel mill, became interested, even at a distance, in the operations of a device out in a far corner of the yard. Walking closer he watched its performance and then asked a few questions.

Over a heap of scrap iron a large metal ball was suspended from a crane arm. Suddenly the ball was released from the arm and plunged down upon the heap of odds and ends, breaking them into smaller pieces. The arm was lowered and the ball was picked up; by magnetism, it was apparent. Then it was dropped again on the heap, picked up again and dropped again.

The textile man knew what would be done with the scrap iron once it was reduced to the proper size; it would be melted in one of the furnaces and become one of the elements of the steel that was being made. But he didn't know the name of the efficient machine, and he was curious to know how much the ball weighed. So he asked.

"The ball weighs twenty-two tons," the man in charge told him, "and it's called a skull-cracker."

The textile man smiled.

"I'm the superintendent of a cotton mill and sometimes we have skull-crackers; but they're not like that. They're all inside of our heads."

There is more similarity than he thought between the skull-cracking problems of the textile mills and the iron-smashing device of the steel mills.

If ideas were not being scrapped all the time and new ones taking their places in the textile industry, there would be little need for a trade paper like COTTON. And there would be less reason for the advertisers of equipment and supplies to use space.

But there are seldom any ready-made solutions or ideas for solving the most vexatious of mill problems. An executive generally has to take a lot of ideas that have been tried in other mills and pound them to pieces and then subject them to the white-hot heat of his own knowledge and experience before they may be blended into the steel-like composite that will serve for his own mill.

Plans and ideas can seldom be **adopted** as a whole; they have to be **adapted** to the local conditions.

CUTLER-HAMMER "X" STARTERS ARE BUILT TO A STANDARD OF MILLIONS OF OPERATIONS

AUTOMATIC
Push-Button Control Saves
TIME
ACCIDENTS
MACHINERY

1 *Thermal Overload Protection. Cuts motor from line only when heating of motor windings becomes dangerous. Easily reset from outside of case.*

2 *Overload release easily adjustable to insure maximum output from motor without danger to windings.*

3 *Interchangeable heater coils in Thermal Relays make every starter handle wide range of motor sizes.*

4 *Double pull solenoid type magnet. Quick action. Long, steady, heavy pull insures full roll-and-rub contact action. Coo! operation of contacts and freedom from pitting assures long life.*

5 *Magnet coils easily interchanged to alter rating of starter or to make quick repairs or replacements.*

6 *Hardened and ground steel bearings used for switch mechanism. Adjustable to compensate for wear through years of steady service.*

7 *Individual fingers or entire switch assembly easily removed for repair or replacement.*

8 *Contacts easily removed for quick dressing or replacements. Contacts are heavy copper built to provide superior electrical connections with minimum wear.*

9 *Chimney type arc shields and heavy blow-out coils quickly carry arc away from contacts, greatly increasing their life.*

10 *Arc shields are easily removed for quick repair or replacement. The free working room thus provided makes repair of contacts simple and easy.*

11 *Case designed to provide easy access to all parts of starter. Entire design such that installation and repair work of any sort requires least possible time and effort.*

12 *Entire panel easily removed from case when installation requires wiring be pulled through conduit.*

Your Across-the-Line Starters

To be Star Performers they must have *these* STAR features

TO understand why the new C-H "X" *Across-the-Line* Starters have created such a sensation, it is only necessary to examine one of them. You'll see features never found in starter design before. You'll find full proof of the months of study, testing and experimenting that made possible the C-H standard of *millions of operations.*

Millions of operations—such starter service your plant, most likely, will never demand—but the inbuilt dependability and slow depreciation this standard insures, mean big savings in operating and maintenance charges.

Specify Cutler-Hammer for your next A. C. Automatic Starter installation. Check over the features. Watch it in service. You, too, will say "Nothing else but C-H for us after this!"

The CUTLER-HAMMER Mfg. Co.

Pioneer Manufacturers of Electrical Control Apparatus

1221 St. Paul Avenue

MILWAUKEE, WISCONSIN

CUTLER C-H HAMMER

Industrial Efficiency Depends on Electrical Control

AMONG COTTON'S READERS

Norman B. Hill, Superintendent,
Caswell Cotton Mills, Inc.,
Kinston, North Carolina.

Secretary-Treasurer, Eastern North Carolina Division,
Southern Textile Association.

"I have been a constant reader of COTTON for a number of years and do not see how anyone connected with the textile industry can afford to be without it."

Norman B. Hill

NATIONAL SULFUR ORANGE G CONC.

AN addition to the National's extensive line of Sulfur Dyes, producing orange shades of yellowish tone. Characterized by excellent solubility, good level dyeing properties, and good fastness to both washing and light.

Applicable to cotton in all forms, either as raw stock or yarn in all types of modern pressure dyeing apparatus, or as piece-goods in jigs and continuous machines.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

With the Publishers—

Too Much Taken for Granted.

When Captain McMillan returned from the Arctic regions a couple of years ago he reported that the Eskimos had not become excited over the radio. They took it for granted.

A Chicago paper told how, at the first big show of aeroplanes held on the lake-front in that city fourteen or sixteen years ago, a child of six was sitting with his mother. The machines flew past in a long string and the mother was thrilled. "Look, George, look!" she said. "Isn't it wonderful?"

"Look where?" demanded George. "Oh, those! Mother, I've dropped a penny through this little hole in the board."

In the same way, the display advertising in COTTON is too often taken for granted. Not, however, by those mill managers who have solved difficulties by purchasing equipment and supplies through this source. They realize what these advertisers have accomplished in bringing their products up to a standard before displaying them to the industry. Some special equipment is worked on for many years before attempting to bring it out. One concern we know of placed machines and supervising operators in three widely separated mills where they could be watched under average mill conditions, and continued this practice for several years before offering the equipment in the market. As one writer has said: "It is only when we realize difficulties that we become excited over accomplishment."

We know of many mill men who have found COTTON'S advertising pages of real value to them, and what we would like to do is to convince everybody in the textile industry that it will pay them to form the habit of looking over these pages regularly.

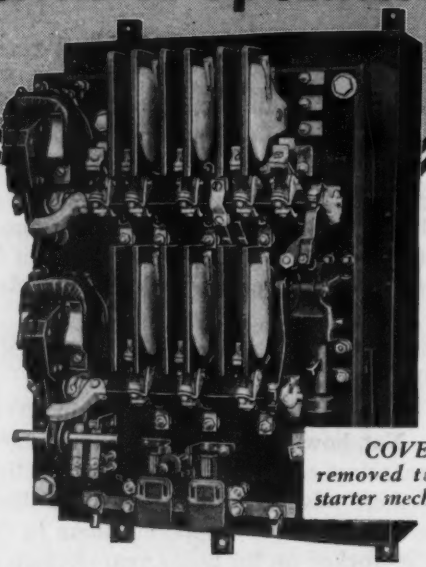
At the same time we want to avoid furthering the phrase "It pays!" in connection with advertising. The phrase, "It pays to advertise," was set in motion several years ago by a successful Broadway show. It is a catch-phrase and catch-phrases generally lead to an absence of thinking.

This taking for granted the marvels of advertising and not finding out what it really does was condemned recently in an address by Merle Thorpe, editor of The Nation's Business, before the Chicago Advertising Council. He said:

"Of course 'advertising pays'. But so does manufacturing pay, so does transportation pay, so does retailing pay. Advertising doesn't pay in any peculiar way. It would be just as foolish to say that sending out one hundred salesmen pays. If those salesmen were tongue-tied it would not pay and would be an economic waste; if advertising is tongue-tied it is a waste."

Advertising in COTTON is not tongue-tied; it talks—and it speaks in the language of the mill man.

The Auto-Transformer Starters Built to a Standard of Millions of Operations

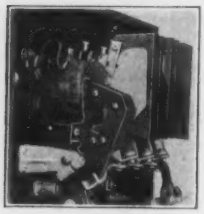


COVER removed to show starter mechanism.

1 *Thermal Overload Protection. Cuts motor from line only when heating of motor windings becomes dangerous. Easily reset from outside of case.*

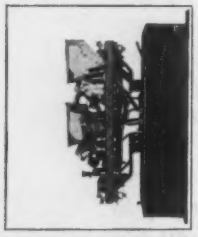
2 *Overload release easily adjustable to insure maximum output from motor without danger to windings.*

3 *Thermal Overload Relays easily and quickly reset from outside of starter case.*



4 *Magnet coils easily interchanged to alter starter rating. Shading coil assures quiet, efficient operation.*

5 *Double pull solenoid type magnet. Strong, positive pull insures full roll-and-rub contact action. Cool operation of contacts and freedom from pitting provides long life.*



6 *Case designed to provide easy access to all parts of starter. Entire design such that installation or adjustment of any sort requires least possible time and effort.*

MILLIONS OF OPERATIONS—such starter service your plant, most likely, will never demand—but the inbuilt dependability and slow depreciation which this standard insures, mean big savings in operating and maintenance charges.

This new high standard of performance, which Cutler-Hammer engineers have made possible, is the result of a most searching analysis of squirrel-cage motor starting and operating conditions. Every feature in these new C-H Auto-Transformer Starters shows clearly the months of designing and testing which brought perfection.

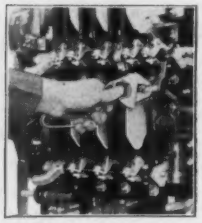
Specify "Cutler-Hammer" for your very next Auto-Transformer Starter job. Check over the features. No mussy oil switches! Hardened steel switch bearings! Quick reset, adjustable, consistent timing device! New chimney type arc shields—more effective, and removable without tools! Note easy access to transformer taps to regulate starting current to 50%, 65%, or 80% of normal.

More than a dozen other features will also merit your praise, as they have wherever shown to practical men who appreciate the time and trouble thus saved in service. More detailed information gladly furnished on request.

The CUTLER-HAMMER Mfg. Co.
Pioneer Manufacturers of Electric Control Apparatus
1221 St. Paul Ave. MILWAUKEE, WIS.

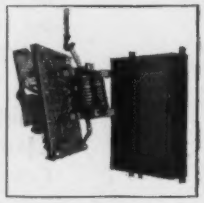
7 *Arc shields are easily removed for quick repair or replacement. The free working room thus provided makes repair of contacts simple and easy.*

8 *Chimney type arc shields and heavy blow-out coils quickly carry arc away from contacts, greatly increasing their life.*



9 *Simple, consistent and accurate timing device for unfailing dependability. Note ease of adjustment of time interval.*

10 *Hardened and ground steel bearings used for switch mechanism. Adjustable to compensate for wear through years of steady service.*



11 *Balanced panel design arranged with hole for crane hook makes handling for installation simple and easy.*

12 *Weight of starter supported by mounting strips back of case—not by case. Installation rigid and permanent.*

CUTLER C-H HAMMER

Industrial Efficiency Depends on Electrical Control

AMONG COTTON'S READERS

T. W. Harvey, Superintendent,

Rodman-Heath Cotton Mills,

Waxhaw, North Carolina.

"I have been a reader of COTTON for years, and consider it one of the best publications of its kind. The discussion of practical questions in each issue is very interesting and helpful to the craft."

T. W. Harvey

NATIONAL SULFUR ORANGE G CONC.

AN addition to the National's extensive line of Sulfur Dyes, producing orange shades of yellowish tone. Characterized by excellent solubility, good level dyeing properties, and good fastness to both washing and light.

Applicable to cotton in all forms, either as raw stock or yarn in all types of modern dyeing apparatus, or as piece-goods in jigs and continuous machines.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

NATIONAL N DYES

With the Publishers—

Too Much Taken for Granted.

When Captain McMillan returned from the Arctic regions a couple of years ago he reported that the Eskimos had not become excited over the radio. They took it for granted.

A Chicago paper told how, at the first big show of aeroplanes held on the lake-front in that city fourteen or sixteen years ago, a child of six was sitting with his mother. The machines flew past in a long string and the mother was thrilled. "Look, George, look!" she said. "Isn't it wonderful?"

"Look where?" demanded George. "Oh, those! Mother, I've dropped a penny through this little hole in the board."

In the same way, the display advertising in COTTON is too often taken for granted. Not, however, by those mill managers who have solved difficulties by purchasing equipment and supplies through this source. They realize what these advertisers have accomplished in bringing their products up to a standard before displaying them to the industry. Some special equipment is worked on for many years before attempting to bring it out. One concern we know of placed machines and supervising operators in three widely separated mills where they could be watched under average mill conditions, and continued this practice for several years before offering the equipment in the market. As one writer has said: "It is only when we realize difficulties that we become excited over accomplishment."

We know of many mill men who have found COTTON'S advertising pages of real value to them, and what we would like to do is to convince everybody in the textile industry that it will pay them to form the habit of looking over these pages regularly.

At the same time we want to avoid furthering the phrase "It pays!" in connection with advertising. The phrase, "It pays to advertise," was set in motion several years ago by a successful Broadway show. It is a catch-phrase and catch-phrases generally lead to an absence of thinking.

This taking for granted the marvels of advertising and not finding out what it really does was condemned recently in an address by Merle Thorpe, editor of The Nation's Business, before the Chicago Advertising Council. He said:

"Of course 'advertising pays'. But so does manufacturing pay, so does transportation pay, so does retailing pay. Advertising doesn't pay in any peculiar way. It would be just as foolish to say that sending out one hundred salesmen pays. If those salesmen were tongue-tied it would not pay and would be an economic waste; if advertising is tongue-tied it is a waste."

Advertising in COTTON is not tongue-tied; it talks—and it speaks in the language of the mill man.

Here's a Challenge

to every mill man looking for a cleaning system that cleans!

Mill men have been waiting a long time for a really efficient cleaning system—and now we not only offer this system, but also an attractive proposition to back it up.

We are willing to ship our latest type bronze equipped "Centrif-Air" Adjustable Cotton Cleaning System to your mill with the understanding in advance that, unless you can see for yourself that it does radically reduce your present operating fire hazard, insure the delivery of cleaner cotton to the pickers, and prove absolutely satisfactory from every other viewpoint, it is to be returned for full credit without question or quibble.

Write today for this unusual offer.

UNCONDITIONALLY GUARANTEED:

1. Not to curl or damage cotton as it goes thru the machine.
2. To remove more light leaf than any other machine.
3. To free cotton from metal, rocks, glass, heavy seed and all hard materials, heavier than the staple itself.
4. To have a lower fire hazard than any other cleaner in the world.

The

CENTRIF-AIR MACHINE CO., Inc.

Atlanta, Georgia

The

"Centrif-Air"

Adjustable Cotton Cleaning System

AMONG COTTON'S READERS

T. A. Hightower, Manager,

Kendall Mills, Inc., (Addison Mills)

Edgefield, South Carolina.

"In the course of human life if a man is to reach the top of success and stay there, he must grasp every available progressive idea. It is very necessary for him to keep abreast of the times. Through the reading and studying of COTTON, I think we would be able to do this. I have gotten a good deal of information from this magazine as to how other mill men do things, which has meant very much to me."

T. A. Hightower

NATIONAL
SULFUR ORANGE G CONC.

AN addition to the National's extensive line of Sulfur Dyes, producing orange shades of yellowish tone. Characterized by excellent solubility, good level dyeing properties, and good fastness to both washing and light.

Applicable to cotton in all forms, either as raw stock or yarn in all types of modern dyeing apparatus, or as piece-goods in jigs and continuous machines.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
CHARLOTTE		TORONTO

NATIONAL DYES

NATIONAL N DYES

With the Publishers—

What the Historian Overlooks

"To assess the value of the services which business papers collectively have rendered to increase the prosperity and welfare of **all the people** would be a task of hopeless magnitude."

Had that angle of it ever occurred to you? It hadn't to us. In fact, COTTON has kept the idea of specialization and the interest of the textile industry in mind so well, that the possibility of being a great social factor has been overlooked.

Of course, we knew in a way that improvements and progress in the textile industry were passed on to the public, but it took a friend of the paper to really impress us with the scope of what business papers and their readers and advertisers have actually done to make America.

This friend of ours has a habit that we are always trying to cultivate in COTTON'S readers. He files stuff that interests him where he can get at it quickly. And out of his file came a keen appraisal of the value of the business press, made in Printers' Ink, by Roy W. Johnson, a paragraph of which is quoted at the beginning of this page.

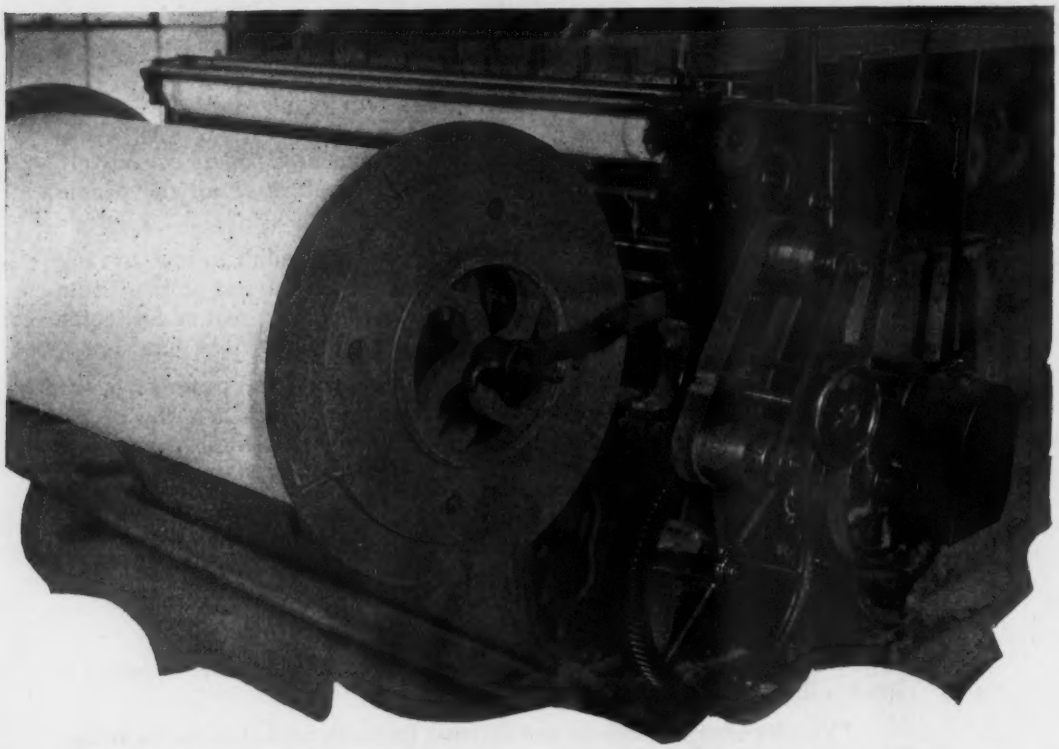
What Mr. Johnson says about the real effect of the business paper is interesting:

"Victory over the inertia and distrust in men's minds, it seems to me, is the real measure of the service which the business press, collectively speaking, has rendered. It is not unlikely that the phenomenal development of science and invention since the Civil War would have been much less marked were it not for the growing influence of the business press, during the same period. For we must remember that consistent progress along those lines depends to a large degree upon the willingness of the practical man of affairs to listen and learn; to discard the old and tried and adopt the new and uncertain. . . . .

"The willingness to cut loose from the accepted traditions of past generations and to adopt new ideas, new processes and new theories was absolutely indispensable to progress, and it was this mental attitude that the business press probably did more than any other instrument to produce.

"Thus, to put it mildly, the contribution of business journalism to the welfare and prosperity of the public has been very great, and quite fundamental. Yet the development of the business press is practically unnoticed by the historian. This is not so difficult to understand because it is of the very essence of the business paper not to obtrude itself upon the general notice. . . . Practically speaking, the ordinary individual has no opportunity to visualize the magnitude of the business press, nor its real importance because he can see only that small part of it which serves his immediate business interests."

To this we might add, parenthetically, that the business press of the present is doing more than ever before in its history to encourage the practical man in independent thinking and constructive action. A concrete example of COTTON'S participation in such work is shown in the references made by members of the Texas Textile Association in the meeting held at Waco and reported in the July number on page 880. Read this report and again digest the statement by Mr. Johnson that the willingness to cut loose from the accepted traditions of past generations and adopt new ideas, new processes and new theories is absolutely indispensable to progress.



Perfect Regulation of Beam Density promotes better dyeing

An important factor in obtaining good results in beam dyeing is the certainty that the various warps are wound on the beams with just the right density.

So important is this item that the Gaston County Dyeing Machine Company spent much money and time, both here and abroad, in perfecting a device that would fit in with the perfection of modern textile machinery.

These efforts have been generously rewarded by the countrywide success of the resulting Warper Density Controlling Device, and justly so, for—

This device may be attached to any beam warper machine so as to wind from warper creels, ball warps, beam warps and sack warps. It will produce any desired density on beams being wound for dyeing from either of those four processes. The yarn may be wound as hard as a stone or as soft as a sponge without stopping the warper for adjustments.

Such features will give you many advantages. Write for further information. No obligations.

GASTON COUNTY DYEING MACHINE CO., Stantey, N. C.

Warper
Density Controlling
Device

Inventors and Makers of:
Beams
and machines for
Beam Drying
Beam Winding
Beam Dyeing
Package Dyeing
Package Drying

AMONG COTTON'S READERS

Hyman L. Battle, Manager,

Rocky Mount Mills,

Rocky Mount, North Carolina:

"I believe that your publication COTTON is helping to fulfill one of the biggest needs in our industry today—namely, that interchange of thoughts and ideas that is so necessary if we are to progress as we should."

Hyman L. Battle

NATIONAL
SOLANTINE GRAY GL CONC.
A Fast-to-Light Direct Dye

DISTINGUISHED by excellent fastness to light and good fastness to washing, sea water, perspiration, alkali, organic acids and rubbing. Possessing excellent solubility and level dyeing properties, it is adapted for application in all types of monel metal machines.

National Solantine Gray GL Conc. is equally as suitable for rayon as for cotton and is recommended for use alone or in combination for the production of a wide range of shades. Having practically no affinity for the animal fibres, it is particularly well suited for silk white effects. Excellent dischargeability with hydrosulfite.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON
PROVIDENCE
CHARLOTTE

PHILADELPHIA
CHICAGO

SAN FRANCISCO
MONTREAL
TORONTO

NATIONAL DYES

With the Publishers—

When COTTON Fires All Its Printers

New inventions which may possibly affect the textile industry are always of interest to mill men. In the same way, inventions that have to do with the printing and publishing fields, or anything designed to distribute ideas, are of interest to the publishers and editors of COTTON. And possibly some of these devices are of interest to the readers because of their sheer novelty. They may never become a part of business paper publishing; but who can tell? Sending photographs by radio or wireless once seemed an impossibility.

An electric book reader, for reading books at high speed, is suggested by Dr. W. R. Whitney of the General Electric Research Laboratories, according to Science and Invention. In fact, the elementary parts of the device already exist, and all that is necessary, it is said, is to assemble them.

"First, there is the 'pallophotophone,' which makes it possible to photograph sounds on a motion picture film by means of a photo electric cell which translates electrical impulses into light rays or light rays into electrical impulses. Then there are numerous loudspeakers which preserve nearly all the natural tones of the voice. It would seem a simple matter to record a long novel on a short stretch of film, and, with a projector and loudspeaker, have it read as rapidly as we desire. It is said that we can understand the electric reader at five times the rate of ordinary talking."

Another invention is the "reading machine," the invention of Rear Admiral Fiske of the United States Navy, by which, it was announced, printing presses and typesetting machinery might be rendered obsolete and the entire publishing industry revolutionized. The matter for this "machine" is produced directly from the typewritten manuscript by photography in combination with the aquatone process and is so microscopic in size as to be practically undecipherable with the naked eye. For example, Mark Twain's book, "Innocents Abroad," was prepared in this way and became only a pamphlet—thirteen pages, three inches by five inches in size, it was stated.

The machine itself consists of a small spring tongs on which are mounted a lens for one eye, a shield for the other and a rack for the reading matter. It folds to the size of a fountain pen.

Maybe the time will come when the valuable information about the profitable plans and new devices in the textile industry must be distributed by one or the other of these novel methods or by something still more revolutionary.

Meanwhile the editors of COTTON and its advertisers are presenting these ideas as graphically and as concisely as possible—and certainly at a reasonable price.

Specialists Demand Specialists

—as in the case of the Chicopee Mfg. Corp.

Successful operators of textile mills must be highly specialized, for every branch of manufacture requires careful and specific training—and textile mill problems are in a class by themselves, requiring special study and treatment.

So textile mill managements appreciate to an unusual degree, and demand for their own service, specialists in other fields—especially in the field of electrical installations. When they are installing electrical systems for new mills, or making expansion developments, they turn to specialists who can meet the needs in both the technical and financial responsibilities.

Huntington & Guerry, as electrical contractors, have for years been closely identified with the development of the Southern Textile Industry. The entire installation of electrical equipment in the mill of the Chicopee Mfg. Corp. of Georgia—including the lighting system of the village—is a recent example of H. & G. trouble-proof service.

We invite correspondence with managements considering electrical problems.

HUNTINGTON & GUERRY,
Incorporated,
Greenville,
S. C.

H&G

TROUBLE-PROOF ELECTRICAL INSTALLATIONS

HUNTINGTON & GUERRY TROUBLE PROOF ELECTRICAL INSTALLATIONS

DRIVING OR LIGHTING MORE THAN 3,000,000 HAPPY SPINDLES

THE LEESONA TARGET

REG. U.S.A. AND OTHER PRINCIPAL COUNTRIES

"The Solution of Every Winding Problem"

TWO essentials to success in any business are a clearly defined target and an unwavering aim. A third of a century ago the Universal Winding Company established for itself, as a goal or target, "the solution of every winding problem." This was and is, to be sure, a highly ambitious program. But no one ever scaled the heights by looking downward.

Since the Leesona target was established, this Company has fired often and accurately, perfecting and marketing winding devices that have maintained leadership in this field. It has built over 2,000,000 winding spindles and marketed nearly fifty different kinds of winding machines. Many of these machines are still the only outstandingly successful mechanisms of their kind on the market.

It takes but few words to claim supremacy in any line of endeavor, but many more to prove it. For those who care to investigate, this Company holds in reserve many pages of convincing proof.

Perhaps the most visible evidence of supremacy of Leesona Universal winding equipment is the factory in which it is built, the largest assemblage of buildings in the world devoted exclusively to making winding machines. In other words, supremacy in size is the logical result of supremacy in demand. Supremacy in demand follows leadership in conception, execution, materials, and service.

Whatever your winding problem, state the facts and this Company can unquestionably offer the solution. Our recommendations cost you nothing. A Leesona sales engineer is ready to call and consult with you at any time.

Why not make your target RIGHT NOW "the solution of every winding problem" in your own mill?

Jot your name on the coupon and mail it to our nearest office.

UNIVERSAL WINDING COMPANY

PROVIDENCE
CHICAGO, UTICA
NEW YORK
BOSTON
MONTREAL AND HAMILTON, CANADA
PHILADELPHIA
CHARLOTTE
ATLANTA

DEPOTS *and* OFFICES *at* MANCHESTER *and* PARIS

Plant of the Universal Winding Company, Providence, R. I.

UNIVERSAL WINDING COMPANY
Providence, R. I.

Gentlemen:

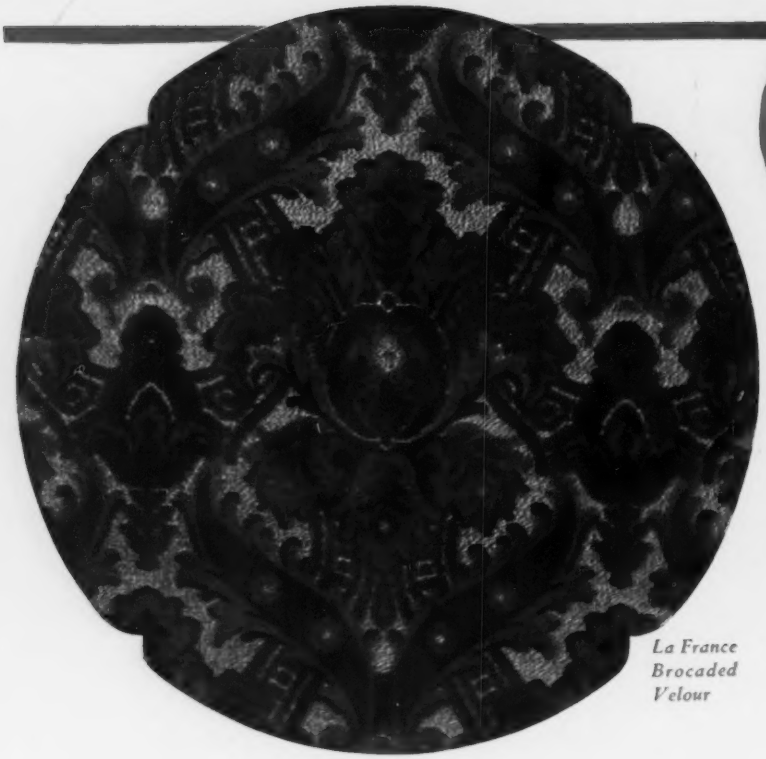
You may send an expert to study our winding problem.

Company .....

Street .....

City ..... *State* .....

Ask for Mr. .....



La France Brocaded Velour

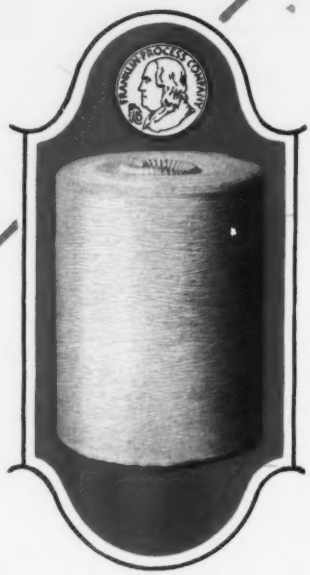
COLOR the Master Salesman

LA FRANCE Textile Industries of Philadelphia are among the foremost weavers of tapestries, damasks, jacquards, velours, etc., in the United States. From January, 1924, up to the present time they have increased their business over 500%. This tremendous growth is attributed by them to their new line of multicolored fabrics.

We point with considerable pride to the fact that we were partly responsible for La France Textile Industries undertaking this new venture. We convinced them by consultation and experimentation that the Franklin Process could make multicolored brocaded velours a practical manufacturing proposition.

Franklin Process Dyeing has been adopted as standard for the pile of this fabric because it has consistently met the unusually severe requirements as to penetration and evenness of shades. Our prompt deliveries and generally good service have also materially assisted this customer in meeting the tremendous increase in sales. The yarn is dyed and delivered in the convenient parallel tube form, all ready for the creel. Production is thus speeded up and waste reduced.

What will colored yarns do for your sales? Let us give you the answer. Use the coupon NOW.



A
FRANKLIN PACKAGE
It will deliver freely either rotating or over end.

FRANKLIN PROCESS COMPANY

Largest Job Dyers of Yarn in America
also Yarn Spinners, Manufacturers Glazed Yarns, Dyeing Machines

PHILADELPHIA PROVIDENCE DENTON, ENG.

New York Office, 66 Leonard St.
SOUTHERN FRANKLIN PROCESS COMPANY
Greenville, S. C.
CENTRAL FRANKLIN PROCESS COMPANY
Chattanooga, Tenn.

FRANKLIN PROCESS

Commission Dyeing of Yarn in the Wound Form

FRANKLIN PROCESS CO.,
564 Eddy St., Providence, R. I.

The possibility of increased sales through the use of color interests us. Please mail us the complete story or have your representative call.

Signed _____

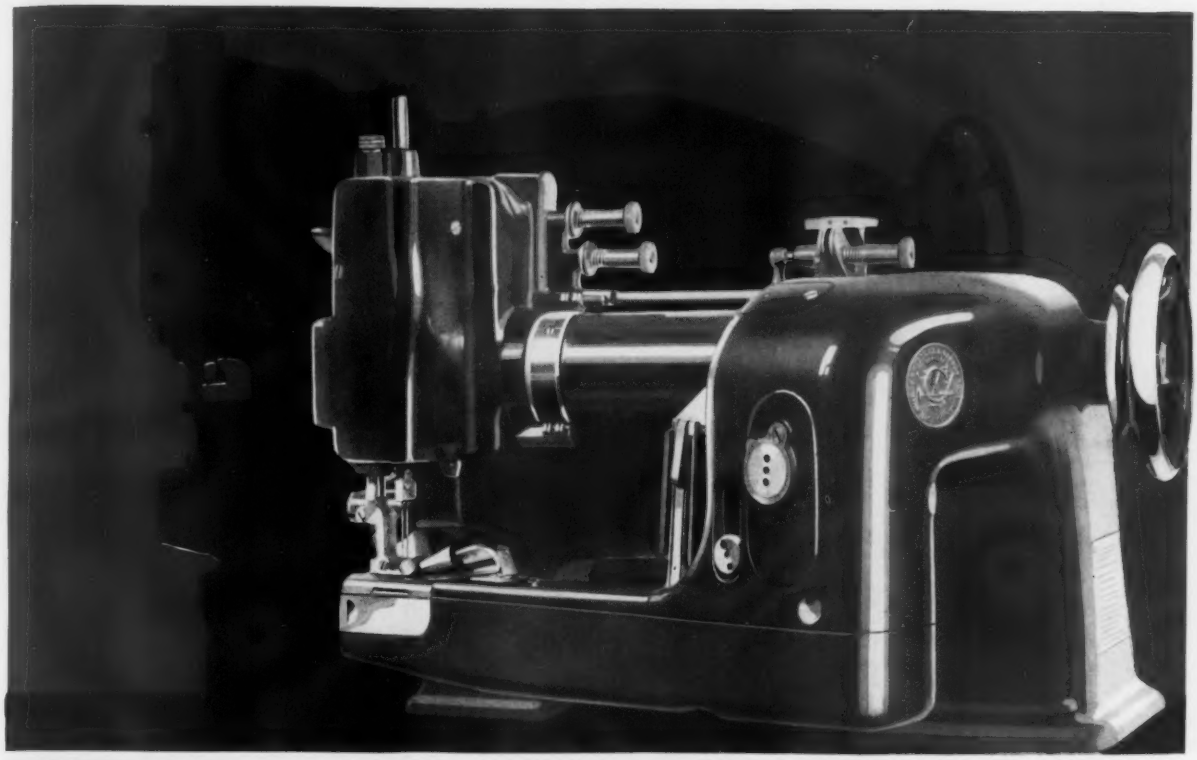
Title _____

Name of Company _____

Street _____

City _____

State _____



1945 1940 1935 1930 1929 1928 1927 -YEARS AHEAD!

Progressive manufacturers are constantly searching for new ways to give their garments an advantage over ordinary production. The Feldlock Machine does so—for it is "The machine that makes production".

Over 130 manufacturers in the United States use the Feldlock for these important reasons:

Makes a two needle lapped fell seam—sews *off* the arm—garments quickly recovered after seaming—operates easily, simple to adjust—makes a beautiful stitch—permits use of lighter sewing supplies.

The Feldlock typifies the high efficiency of all Willcox & Gibbs Sewing Machines.

It is to your advantage to see the Feldlock demonstrated, at our nearest Branch Office. Also, send now for the illustrated Feldlock booklet.

WILLCOX & GIBBS SEWING MACHINE CO.

Home Office: 658 Broadway, New York, N. Y.

Baltimore, Md. 321 No. Howard St.
Boston, Mass. 111 Summer St.
Chicago, Ill. 506 So. Wells St.
Cincinnati, Ohio 206 West 7th St.
Cleveland, Ohio 328 The Arcade
Los Angeles, Cal. 938 Maple Ave.
Minneapolis, Minn. [illegible]
Newark, N. J. 524 Broad St.
Philadelphia, Pa. 131 South 12th St.
San Francisco, Cal. 504 Sutter St.
St. Louis, Mo. 209 No. 10th St.
[illegible] N. Y. Fourth Sts.
Washington, D. C. 702 10th St., N. W.

Canadian Representative: W. J. [illegible] Co., Ltd., Hamilton and Montreal

WILLCOX & GIBBS SEWING MACHINE CO., Ltd.
20 Fore Street, London, E. C. 2, England

Branches

Nottingham, Leicester, Birmingham, Paris, Luton, Brussels, Manchester, Milan, Leeds, Glasgow, Belfast

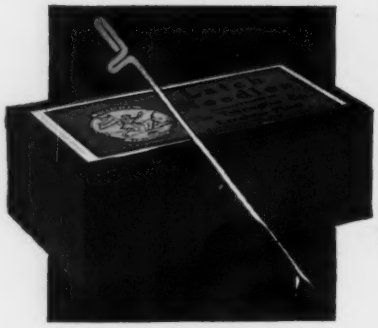
A Red-Letter Day

When you equip with TORRINGTON LATCH NEEDLES

THE "know how" of knitting must be reinforced with proper equipment. And needles are one of the most important mechanical essentials to satisfactory production.

In fact, when machines are filled with Torrington Needles, they can be immediately credited with a greater *quantity* of production, for operation is not slowed up by yarn and needle breakage.

The capsheaf of satisfaction with "Torringtons" however is the profitable stimulation of *quality*. These good needles radically reduce seconds through their ability to consistently turn out top-quality fabrics.



The Torrington Company

ESTABLISHED 1866

Torrington, Conn., U.S.A.

BRANCHES:

THE TORRINGTON COMPANY
CHERRY AND JUNIPER STS.
PHILADELPHIA

C. B. BARKER & CO., LTD.
140-144 W. 22ND STREET
NEW YORK

LOS FABRICANTES UNIDOS
964 CALLE BELGRANO
BUENOS AIRES

FACTORIES AT:
TORRINGTON, CONN.
UPPER BEDFORD, CANADA
COVENTRY, ENGLAND
AACHEN, GERMANY

ALUMINUM PAINT

Facts About Industry's Greatest Protective Medium

INDUSTRY recognizes the Aluminum Bronze Powder produced and sold by the Aluminum Company of America, as the standard of purity and excellence for Aluminum Paint pigment.

Aluminum Paint in its most effective form consists solely of this pure Aluminum Bronze Powder mixed with a tested vehicle of oil or varnish.

When it is applied, the tiny flat flakes of Aluminum pigment "leaf" or lap, one over the other, forming a rust proof, weatherproof film of metal.

It is this "coat of metal" surface that gives Aluminum Paint its wonderful priming qualities when used on wood. That gives it longer life. Keeps it bright and clean and renders it so resistant to fumes and smoke.

Aluminum Paint is the ideal protective coating for practically all materials.

It may be brushed or sprayed on iron, steel, wood, brick or concrete.

ALUMINUM COMPANY *of* AMERICA

2436 Oliver Building, Pittsburgh, Pa.

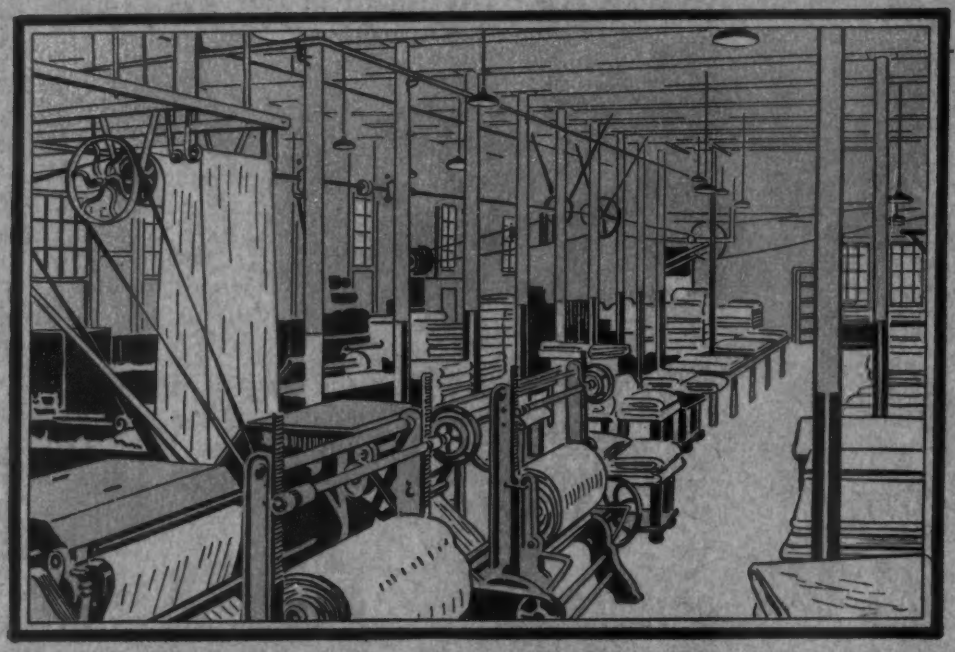
Offices in Eighteen Principal American Cities

ALUMINUM IN EVERY COMMERCIAL FORM

ALUMINUM PAINT

Brighten Your Mill Rooms with ALUMINUM PAINT

It takes but one coat



Cloth Room of the Enterprise Mfg. Co., Augusta, Ga.

CONSIDERED simply from the standpoint of *economy*—aside from its other advantages—Aluminum Paint is the common-sense choice for mill interiors.

It takes but one coat of Aluminum Paint to do the job—its opaque metallic pigment entirely obscures any underlying color—even black. Yet it costs no more than *ordinary* paint and a gallon goes further—covering from 500 to 700 sq. feet of smooth surface.

Now note, also, these other savings it accomplishes. Aluminum Paint *lasts longer*. Its polished surface does not tarnish. Even fumes and smoke have little effect upon its luster. It may be washed free from dust and dirt without injury.

Add to this the soft, well diffused light reflected from silver-gray walls and ceilings and you find that Aluminum Paint contributes still another economy—improved working conditions with their stimulating effect upon production.

The complete story of Aluminum Paint's economies is told in our illustrated booklet—"Aluminum Paint—A Step Ahead in Industrial Painting." Write for a copy today.

ALUMINUM COMPANY *of* AMERICA

2401 Oliver Building, Pittsburgh, Pa.

Offices in Eighteen Principal American Cities

ALUMINUM IN EVERY COMMERCIAL FORM

ECONOMIC REPRESENTATION

SOME mills which are not receiving proper distribution are considering opening their own selling offices.

This is disproportionately expensive unless a mill is very large and its production greatly varied.

THE solution seems to be:

Avoiding agents that carry

CONFLICTING LINES,

thus relegating some of their mills to second place and a good EXPORT DISTRIBUTION for which we have exceptional facilities.

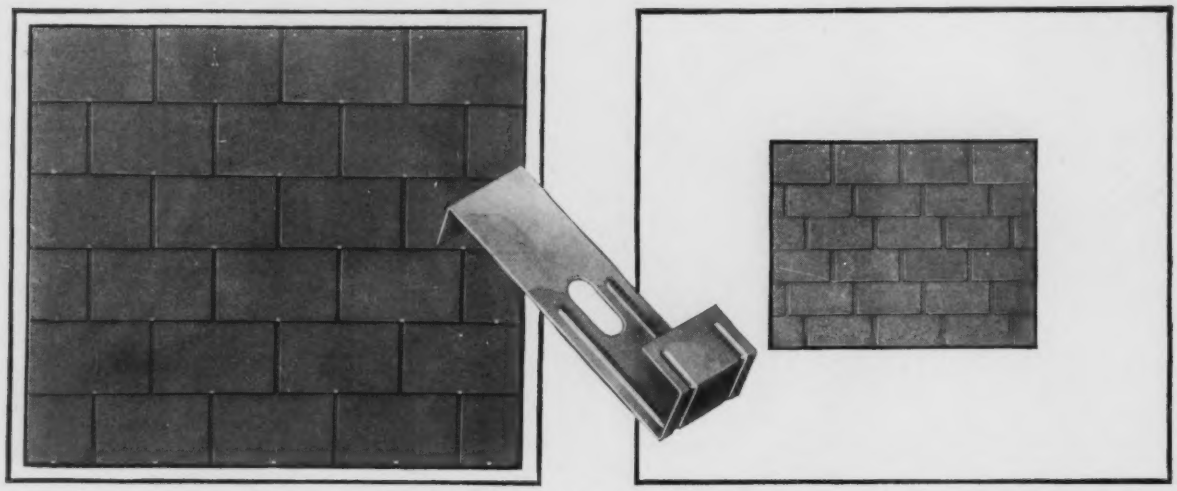
We will be glad to give your problems individual attention.

HESSLEIN & CO., Inc.

DRY GOODS COMMISSION AGENTS

77 WORTH STREET

NEW YORK, N. Y.



2¼ Richardson No. 20 Shingles (15½" x 20") cover 2¼ sq. ft. of roof area as shown above.

This patented applicator is an entirely new invention in the roofing field. With it a roof of Richardson No. 20 Shingles is laid four times as fast as by the old method.

2¼ Standard Shingles (8" x 12¾") cover only 6 sq. ft. of roof area as shown above.

A double-thick roof

- - at remarkably low cost ! - -

Heavier, double-thick material all over the roof —strong, sturdy, for years of hardest wear— fire-resisting and absolutely weather-proof. All this, at the lowest cost ever known for so durable and good-looking a roof!

That, in a nutshell, is the story of the new Richardson No. 20 Shingle.

Its economy results from a wholly new speed in laying. Each Richardson No. 20 Shingle is three times the area of the standard shingle, and is firmly locked to the roof by a patented device. (See illustration.)

This idea, simple enough in itself, permits laying a roof of Richardson No. 20 Shingle *four times as fast* as with ordinary shingles—at far less cost to you. That is why Roberts & Co., cotton mill engineers, Atlanta, Ga., chose it for the modern mill village of the Martha Mills at Thomaston, Ga.

Your nearest dealer in lumber or building materials will be glad to show you Richardson Products for every roofing use.

Laid Four Times As Fast As Ordinary Shingles

Illustration shows the amazing speed of application made possible by pyramiding Richardson No. 20 Shingles. One man nails applicators, the other inserts shingles—the fastest method known.

THE RICHARDSON COMPANY

ATLANTA, GEORGIA

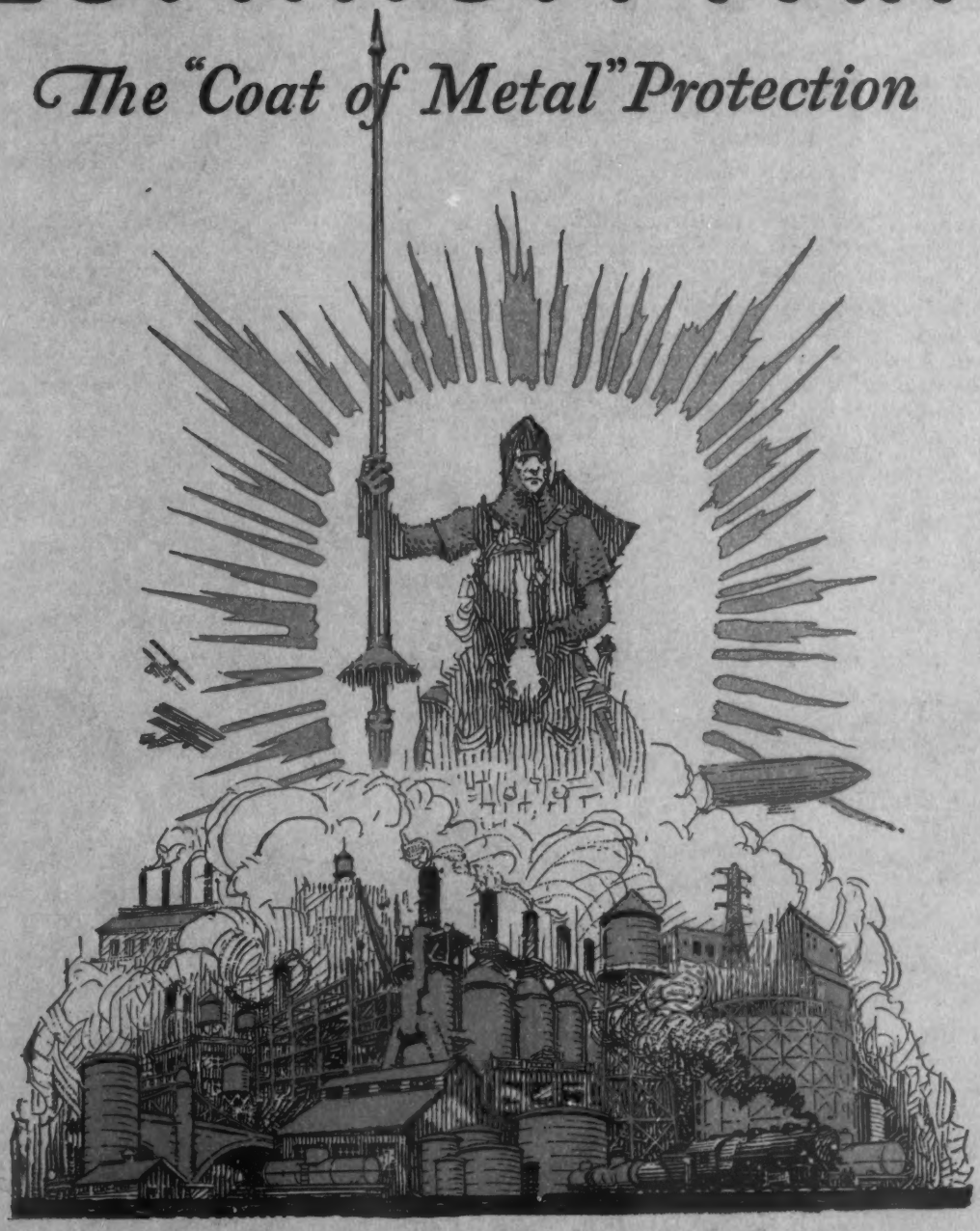
Lockland, (Cincinnati), Ohio Melrose Park, (Chicago), Illinois

New Orleans, Louisiana

RICHARDSON No. 20 SHINGLES

ALUMINUM PAINT

The "Coat of Metal" Protection



THE idea of Aluminum Bronze Powder as a pigment of major importance in industrial painting is new. Yet American Industry has already proved that Aluminum Paint is its most practical protective medium. The particular application of this medium to the Textile Industry is told on the following page. Read it.

Manufacturers and jobbers of the best grade of Aluminum Paint use ALBRON *Pigment as the base of their product.* ALBRON *Pigment is always made of pure* ALCOA *Aluminum.*

ALBRON ALUMINUM ALUMINUM BRONZE POWDER

Aluminum Company of America

2401 Oliver Building · Pittsburgh, Pa.

Offices in Eighteen Principal American Cities

ALUMINUM IN EVERY COMMERCIAL FORM

ALBRON ALUMINUM ALUMINUM BRONZE POWDER

ALUMINUM PAINT

What does it mean to the Textile Plant?

FIRST—in interiors—*Improved Lighting*—a soft, glareless, evenly distributed light from silver-gray walls and ceilings.

SECOND—*Better Protection*—inside and out. Protection against weather and water, against fumes and smoke—the coat-of-metal protection of pure metallic aluminum.

THIRD—*Increased Economy*. Aluminum Paint costs no more than ordinary paints and goes further. A gallon covers 500-700 square feet. One coat completely hides any under color, even black. For interiors *one coat* is all that is needed. To which add *less frequent* re-painting.

FOURTH—*Bettered Appearance*—a brighter, more cheerful place to work when interiors, roofs, fences, tanks and structural work are beautiful with Aluminum Paint.

Aluminum Paint owes its unusual *effects* to a new principle—peculiar to this pigment. This is the principle of "leafing", which results in the formation of an actual coat of non-tarnishing polished metal.

The full explanation of this principle—and a more complete description of its results—are given in the "Aluminum Paint" Booklet. Write today for a copy.

Aluminum Paint consists of Aluminum Bronze Powder mixed with a suitable vehicle of oil or varnish.

Aluminum Company of America

2401 Oliver Building · Pittsburgh, Pa.

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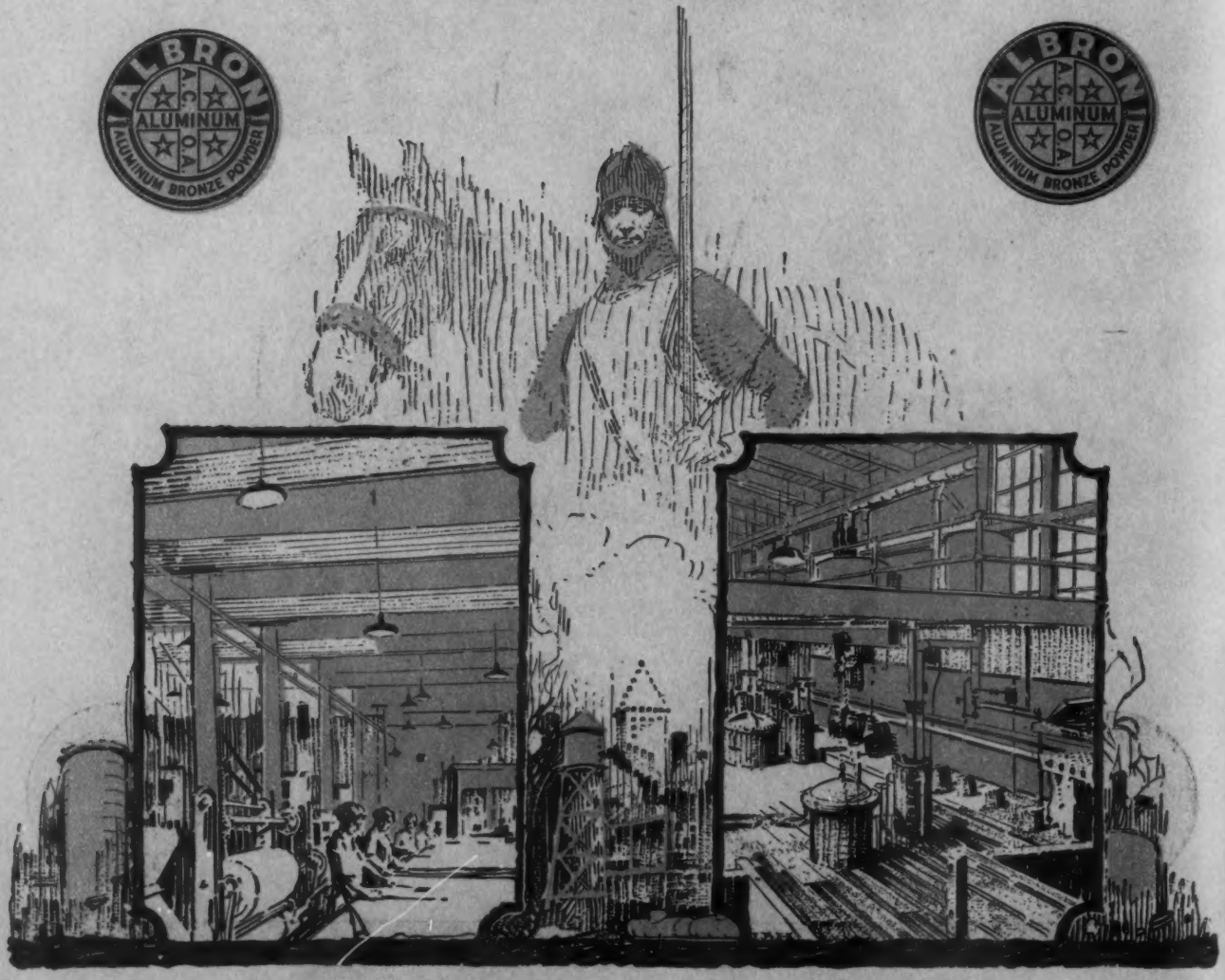
ALUMINUM IN EVERY COMMERCIAL FORM



Why Spin a Lot of Yarn To Be Lost as Waste?

The No. 32 Midget Patent Feeler has eliminated feeler waste as a mill problem.

This Feeler always works. It never misses fire.

The ejected bobbins are as much alike as peas in the same pod. There is never more than the maximum waste for which the Feeler has been set—which may be four or five yards according to the width of the loom.

Let's Talk It Over

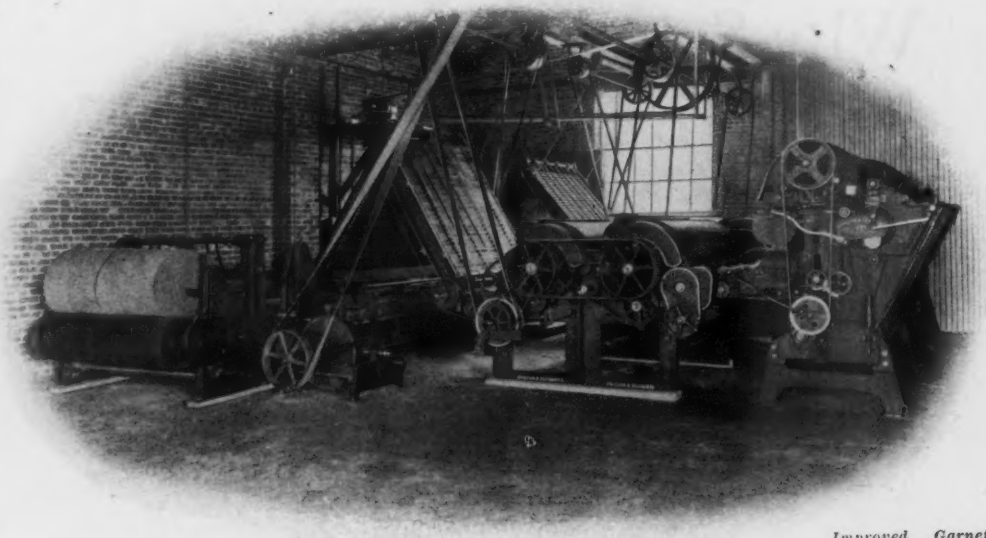
DRAPER CORPORATION

Hopedale Massachusetts

Southern Office Atlanta Georgia

Copyright 1917 by Draper Corporation

COTTON WASTE AND FELTING MACHINERY



Improved Garnett-Camelback Felting Outfit

Steer a Straight Course Buying Waste and Batt Machinery

There's an immeasurable satisfaction in buying "Smith-Furbush" Waste and Batt Machinery. It brings to you the benefits of the most extensive experience in building complete machinery for cleaning all kinds of textile waste—for making wiping waste from cotton mill threads and shredded rags—for opening, cleaning, carding and spinning cotton waste yarn by the woolen system—for making all kinds of mattress and upholstery batting.

It's easy to see that "Smith-Furbush" machines predominate in every branch of textile waste work. It's easy to see the reasons when you investigate the types of Smith-Furbush machines suited to your work—

Pickers, Shredders, Pullers, Willows, Condensers, Shaughnessy Reclaimers, Cards, Garnetts, Blamires, Camelbacks, and auxiliary equipment—each the highest development in machinery of its kind.

Write for information on single machines or complete outfits for your purpose.

PROCTOR & SCHWARTZ, INC.
PHILADELPHIA

DRYING MACHINERY FOR ALL MATERIALS

This Is the Outfit—

To clean, open, and put your cotton in the best possible condition, without curling or injuring the staple in any way, for the processes that follow.

Bale Breaker, Upstroke Cleaner, Vertical Opener, and Cleaning Trunk

Another Upstroke Cleaner can be used if desired instead of the Vertical Opener

AT YOUR SERVICE

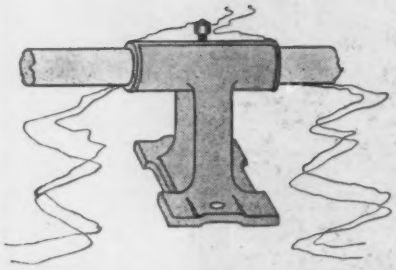
Whitin Machine Works

Whitinsville, Mass.

U. S. A.

Charlotte, N. C. **Atlanta, Ga.**

FIRE!



Plain bearings overheat and give rise to a dangerous fire risk.

PLAIN bearings involve a serious fire risk —and the mill man knows it. Particularly if the bearings are located in concealed or out-of-the-way places.

A safe way to eliminate this hazard is to use Fafnir Ball Bearings. For the housings in which Fafnirs are mounted are tightly-sealed enclosures. The bearings themselves are frictionless, non-wearing and cool-running. Not a chance for lubricant to leak out over floors, machines and product! No danger of overheated bearings!

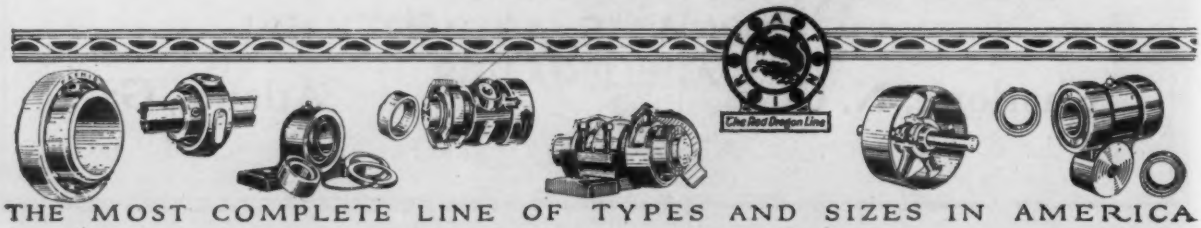
Types, sizes, mountings and prices on request.

And impose still another hazard through the pools of oil such bearings slop over floor.

THE FAFNIR BEARING COMPANY
Makers of high grade ball bearings—the most complete line of types and sizes in America
NEW BRITAIN, CONN.

Southern Representatives:
W. S. Shirley, 120 Bourbon St., New Orleans, La.
A. G. Laughridge, P. O. Box 1847, Atlanta, Ga.
W. P. Cunningham, P. O. Box 1687, Houston, Texas
S. D. Berg, Box 27, Elizabeth Station, Charlotte, N. C.

FAFNIR
BALL BEARING UNIT-ALIGNING TRANSMISSION EQUIPMENT



THE MOST COMPLETE LINE OF TYPES AND SIZES IN AMERICA

"OGDEN—*This is* OAKLAND *We want* 10,000 *lambs"*

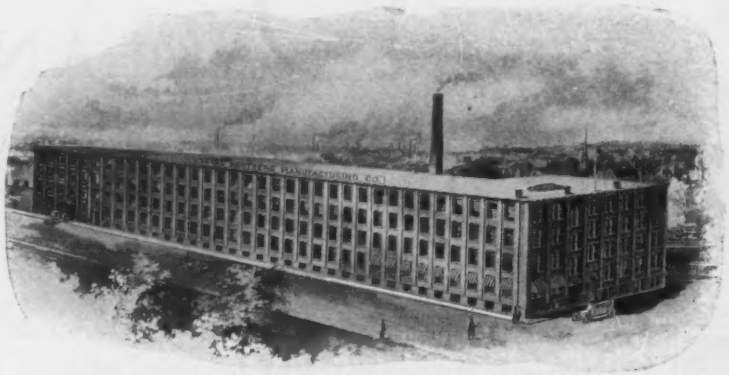
LAMB WAS at a premium. An Oakland, California, meat-packer learned that a large number of lambs were to be put on the market in Ogden, Utah. He got in touch with the commission man by long distance telephone. In a five-minute call he purchased close to 10,000 head. Price, about $90,000. Cost of the call, $6—a saving of at least $150 in traveling expenses. And it enabled the shipment to be started immediately.

TWO MILLION times each day, America's toll and long distance lines are called upon to get something done, to make some saving of time or expense. And the telephone carries the voice and purpose of the executive across states and over the nation just as readily as it does within the limits of a city or a neighborhood. Thousands of concerns are finding ways to let Long Distance calls lessen the wastes of delay and postponement.

Have you taken stock lately of the various things Long Distance might accomplish for you? Is there something you need quickly at the most advantageous price? The telephone will reach the man or concern that has it for sale. Shipment can be made without waiting for the exchange of visits or correspondence. You can go from one market to another in various parts of the country, without leaving your office. Likewise, if you have something to sell, the telephone will reach a buyer, no matter how busy or how far away he may be. Long Distance will accomplish your purpose in less time, and at an actual saving of money.

Our Commercial Department in your own town will gladly assist you in laying out a program of long distance service suitable to your organization. Ask a representative of this department to call upon you, without charge. In the meantime, why not make a test of what distant calls can do? What buyer or seller would you like to talk with, now? . . . *Number, please?*

BELL LONG DISTANCE SERVICE



Our Plant at Worcester, Mass., Established 1886

Buy

CARD CLOTHING

that has met every test *successfully.*

You cannot afford to jeopardize the quality of your fabric by using inferior Card Clothing.

Experience Counts

Howard Bros. Mfg. Co.

Established 1866

Worcester, Mass.

Southern Agent
E. M. TERRYBERRY
Commercial Bank Bldg.,
Charlotte, N. C.

Assistant Southern Agent
G. L. MELCHOR
121 So. Forsyth St.,
Atlanta, Ga.

SPECIALIZED REPRESENTATION

WE adhere strictly to the policy of special representation of mill accounts and avoid representing mills whose fabrics conflict.

THIS insures each mill maximum distribution as each fabric represents a specialty and is prominently brought to the trade's attention.

OUR policy.

"NO CONFLICTING LINES"

means individual and personal representation.

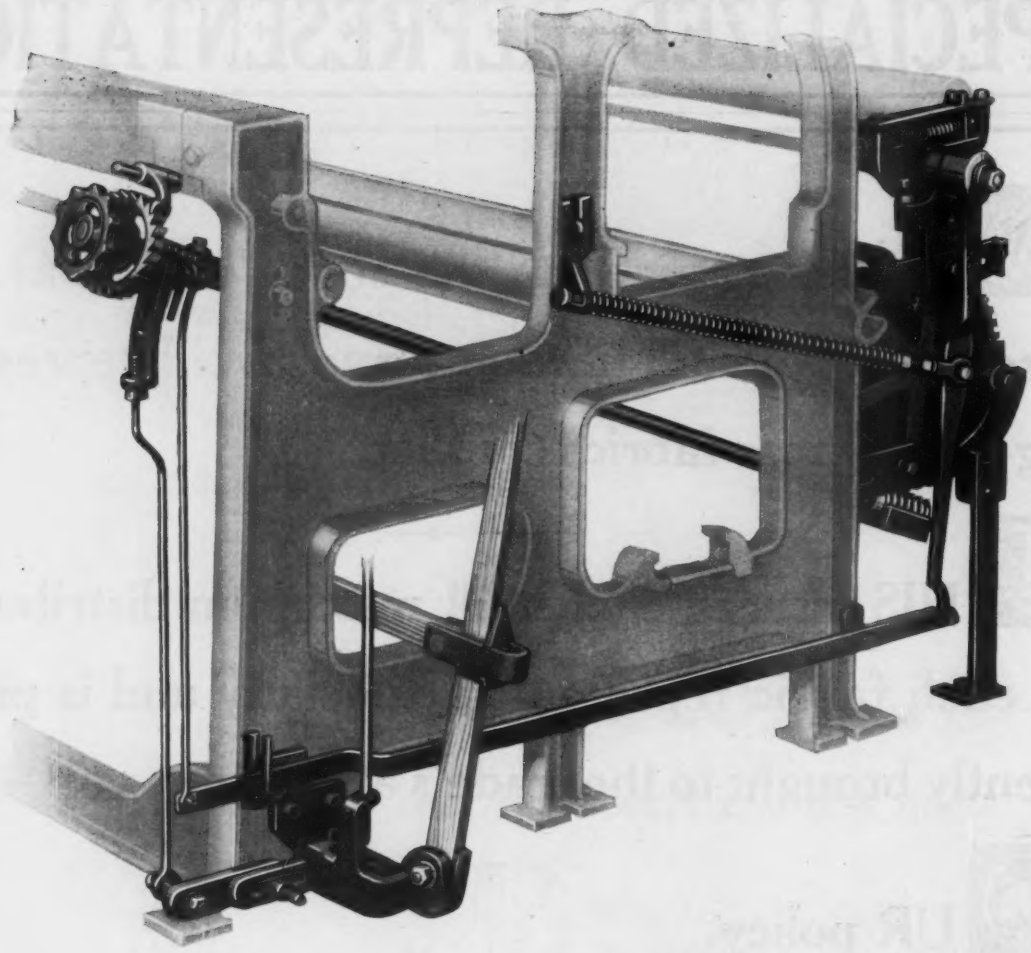
We will be glad to give your problems individual attention.

HESSLEIN & CO., Inc.

DRY GOODS COMMISSION AGENTS

77 WORTH STREET

NEW YORK, N. Y.



ILLUSTRATING

A NEW AUTOMATIC LET-OFF FOR SILK LOOMS

May also find use on Rayon and Cotton

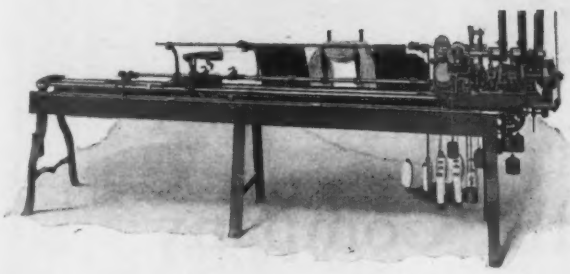
HAS ALREADY REACHED THE REPEAT ORDER STAGE

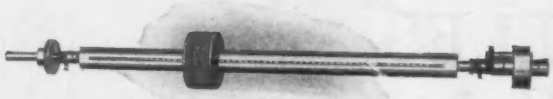
BUILT [like other new and good devices]

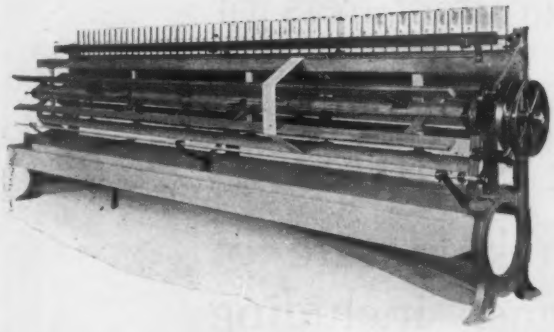
by HOPEDALE MANUFACTURING CO., MILFORD, MASS., and GREENVILLE, S. C.

Whether

for Spooling, Warping or Winding Easton & Burnham Machinery Fills Exacting Requirements







Performing with absolute precision, Easton & Burnham Machinery represents a paying investment in spooling, warping or winding.

◆ ◆ ◆

Take the Reel for instance, whose design alone proves that it will fill the most exacting requirements. It is very compact, tended entirely from the front side. Swifts are light but extremely rigid, kept straight and true by steel truss rods, which permits higher speeds without vibration. Equipped with Grant traverse motion. Automatic measuring and resetting stop motion without change gears.

◆ ◆ ◆

The Easton & Burnham Automatic Banding Machine is the only automatic machine on the market for making loop bands for spinning, twisting, spooler and mule spindles. No attention is required for making complete bands of any required length if supplied with the desired number of strands of prepared roving. One machine will supply 60,000 spindles.

◆ ◆ ◆

True running wheels, free from vibration, are assured in Easton & Burnham Card Grinders. Only the best grade "Atlas Brand" emery fillet is used. Traverse Grinders are accurately balanced, fitted with pulley, hardened steel shaft, socket, and 3" shell with gliding differential motion.

Write for full information on the entire line of Easton & Burnham Products.

EASTON & BURNHAM

Spooling, Warping and Winding Machinery

MAIN OFFICE AND EXPORT AGENT
PAWTUCKET, R. I.

COMPLETE EQUIPMENT

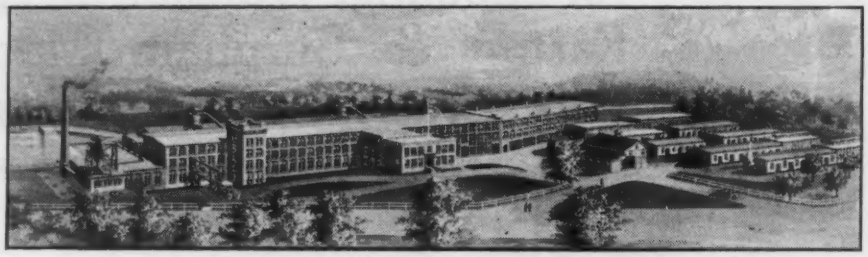
WOONSOCKET MACHINE & PRESS CO., Inc.
OPENING AND PICKER ROOM, CARDING, DRAWING AND ROVING MACHINERY

FALES AND JENKS MACHINE COMPANY
SPINNING AND TWISTING MACHINERY

EASTON & BURNHAM MACHINE COMPANY
SPOOLING, WARPING AND WINDING MACHINERY

SOUTHERN OFFICE
WOODSIDE BLDG.
GREENVILLE, S. C.

COTTON MACHINERY



Established 1843

Litchfield Shuttle Company

Southbridge, Mass.

SHUTTLES
of Every Variety

Inventors and manufacturers of new devices in

Automatic Shuttles

best suited for taking care of present conditions, including

Rayon

and other modern fabrics.

If you have not seen these, send us one of your shuttles and a bobbin filled with yarn and let us send you a sample pair, free of charge, to try.

More Money from Stafford Looms

THOUSANDS of Stafford Looms are setting new records for quantity and quality production—and profits.

¶An investment in Stafford Looms never fails to pay dividends.

¶Every mill executive interested in plant efficiency should have a copy of the book describing our lines of textile machinery. May we suggest that you write for a copy?

STAFFORD

THE STAFFORD COMPANY

Weaving Machinery

READVILLE, MASS.

SOUTHERN AGENT: FRED H. WHITE, Charlotte, N. C.

PATERSON OFFICE: 179 Ellison Street, Paterson, N. J.

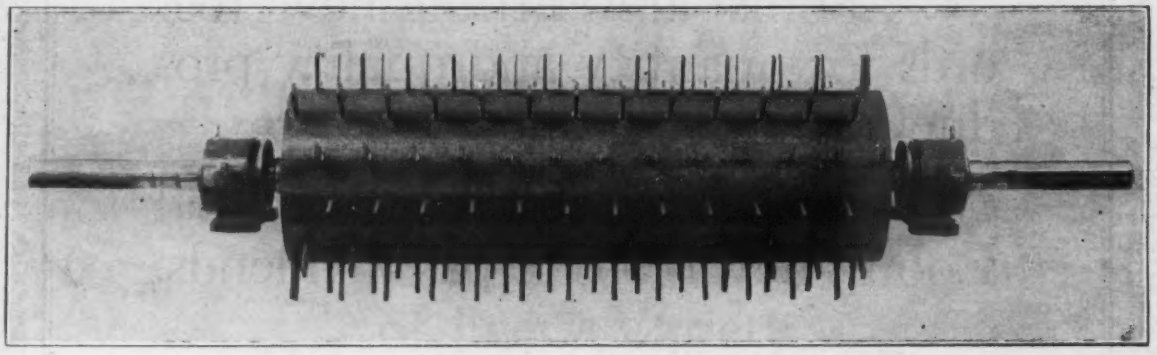
CANADIAN REPRESENTATIVES: ROSS WHITEHEAD & CO., LTD., Montreal, Canada

For Strongest Yarn and Fewest "Nits"

Use a beater that does not tear or break the cotton fibres

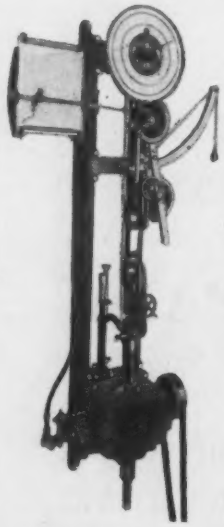
THE ALDRICH CYLINDER BEATER

Cleans the cotton and makes a well opened, even lap, with half the blows per inch required with an ordinary beater. A stronger, smoother yarn is the result



FOR PRESERVING THE STRENGTH OF COTTON,
USE AN ALDRICH CYLINDER BEATER—

FOR TESTING THE STRENGTH OF YARN,
USE A SCOTT AUTOMATIC POWER
YARN TESTER



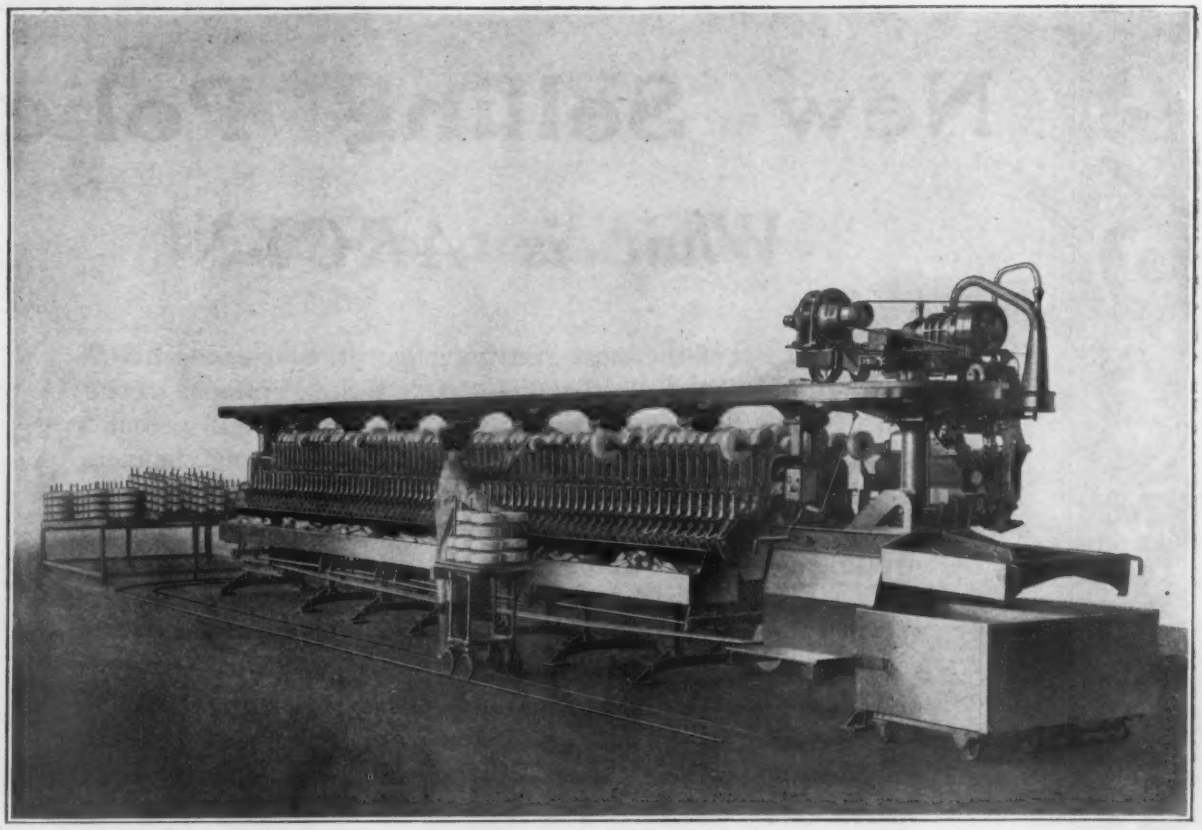
Combination Automatic Power Yarn and Cloth Tester

The world's standard yarn testing machine, used and approved by the U. S. Bureau of Standards, and other Government Departments.

Every mill should have a modern, accurate, dependable testing machine. There is a Scott Tester made for your requirements—whatever they may be. We are their southern selling agents, and will welcome your inquiries.

ALDRICH MACHINE WORKS

Greenwood, South Carolina



140 SPINDLE AUTOMATIC SPOOLER

COMPETITION demands better quality to sell at a lower price. There is only one method of meeting this problem . . . installation of high production automatic equipment to improve quality and reduce labor costs.

"Every Knot a Weaver's Knot"

BARBER-COLMAN COMPANY

GENERAL OFFICES AND PLANT

ROCKFORD, ILL., U. S. A.

FRAMINGHAM, MASS. GREENVILLE, S. C.

New Selling Policy

What is ARCY?

BECAUSE of the most gratifying reception accorded ARCY by Southern Mills that know ARCY'S exceptional merits, and in order to make it most convenient for new mill accounts to purchase ARCY through their regular purchasing channels, the distributers of this product are offering ARCY for sale through regular mill supply houses, and firms dealing in warp dressing and cloth finishing materials.

¶ ARCY is not supposed to replace the usual softeners used in a starch size mix, and is not competitive with any such materials on the market. ARCY is a product depending for its activity on enzyms, is in dry powder form, and when added with ordinary thick boiling pearl corn starch in the size kettle, completely liquefies each separate starch granule, forming a slow congealing thin liquid, possessing marked penetrative and binding properties. Hence the usually noted reduction in "shedding" under the loom, with reduced amount of weave room floor sweeps. The smooth feel imparted to the starch sized warp, is due to each granule of starch being thoroughly liquefied. This assists the usual softeners to do their work best, producing a smooth pliable thread.

Trademark Reg. U. S. Patent Office

for ARCY

What Is an ENZYM?

¶ Mills using ordinary thick boiling pearl starch liquefied by ARCY do not need worry if one Starch Manufacturer's 40 fluidity starch is another Starch Manufacturer's 50 fluidity starch, or another's 20 fluidity, or 10 fluidity, and so on. Uniform results may be expected from ARCY liquefied thick boiling pearl corn starch, because this starch is *natural* starch just as made by *nature*, and washed from the grain. It is the basis from which all "modified" starches are manufactured by treatment with an acid, or other chemicals, to alter its properties. It is the starch which has had the least done to it, and therefore the least expensive of all the starches to purchase.

¶ ARCY is by no means a new, untried product. For more than three years ARCY has been used continuously in a number of Southern Mills. Back in the latter part of 1923 ARCY was adopted in about 16 Southern Mills, where results were watched very closely for 18 months before offering it for sale to the general public. Not only are these original mills still using ARCY liquefied thick boiling pearl starch exclusively; but practically every single mill has adopted ARCY which has found out about its many advantages since that time. Some few went off for awhile, but came back.

¶ Any mill that does not know about all the many advantages to be had from the use of ARCY, is invited to make first hand investigation at any of the many mills now using ARCY. There is bound to be one or more such mills near by.

¶ For new mill accounts ARCY is offered for sale through regular Mill Supply Houses, and through firms dealing in warp dressing and cloth finishing materials. Also through the distributors.

Manufactured by

AMERICAN RAPIDASE COMPANY, INC.,

DISTRIBUTED THROUGH

DRAKE CORPORATION

NORFOLK, VIRGINIA

The Economy of Adequate Humidification

ParkSpray Humidification Means Money for You

Striking Balances

So then, we have climate to contend with; the climate of geography and the climate in each mill that is incidental and internal—and individual.

The only way to make humidifying economical is by means of evaporation and air change.

You remember I told you of other factors which greatly affect the quantity of vapor we shall have to produce—such as exposure, width, height, construction, etc. Even the points of compass are not to be disregarded, for the sunny side of a mill is warmed to an appreciable extent. Shade has a slight cooling effect. Flat, black tar roofs absorb a tremendous amount of heat from the sun. Adjacent open water causing slightly higher moisture content in the entering air makes our "make-up" problem a little easier. In low-posted rooms the percentage of heat per cubic foot is considerably greater than in a high-posted mill.

All of these factors must be taken into account in designing the proper system of adequate and economical humidification.

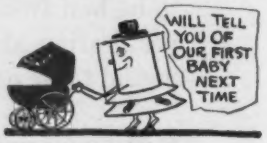
And yet under average conditions 85% of the water required to obtain the desired atmospheric conditions in a spinning room is used to absorb the frictional heat of the machinery. I have told you that before—but I want to emphasize it again.

So then—if we depend on air change alone we are out of luck. Using evaporation as we do partly for humidification, we must provide some way for the evaporated moisture to escape to get the cooling we want. The train is loaded and must be moved to do any good—and make a place for another train to be loaded, to be moved, to make a place for another and still another.

The economy of adequate humidification comes in using these two forces — evaporation and air change— and getting them into balance.

The more water added (with the same air change) the lower the temperature of our plant will be. The limit of low temperature (you never could reach it) will be the outside wet bulb temperature; at the same time the humidity will be higher—approaching saturation as a limit.

With allowances for all these local conditions, the cooling effect of humidifiers varies with their evaporative capacity; varies with the pounds of water we can get the air to take, at the condition wanted. But always remembering that they must be "in balance" with the proper air change.



Now is there more to this 'ere business of humidification than you thought? Why we haven't begun!

Parks-Cramer Company
Engineers & Contractors
Industrial Piping and Air Conditioning
Fitchburg Boston Charlotte
Canadian Agents, W. J. Westaway Company, Ltd.
Hamilton, Ontario, Montreal, Quebec.

Adequate Humidity means adequate capacity. Capacity means gallons.
In gallons of water evaporated, ParkSpray equipment is the lowest in price.

To All Southern Textile Mill Owners:

YOU can do yourselves a service by encouraging this economy move

YOU have a very definite interest in the cost of your equipment. The more it costs, the less your margin of profit—and the lower the volume of your sales. That's fundamental.

You know the economies which keep your costs below those of the Eastern mills. You know the benefits of Southern location in general—and the Atlanta Industrial Area in particular.

Tell the story to the men from whom you buy machinery and supplies. Tell them how much they can save *you* and themselves by locating branch plants in Atlanta. Tell them how much better they can service your equipment if they are located in Atlanta.

Send for this booklet

which gives the experience of some of the 680 great concerns which have already come to Atlanta to serve the rich Southern market.

It is very much to your interest. It will save you money.

The Atlanta Industrial Bureau has studied the matter carefully. There is an answer to every objection made by the machinery people—who are naturally reluctant to move.

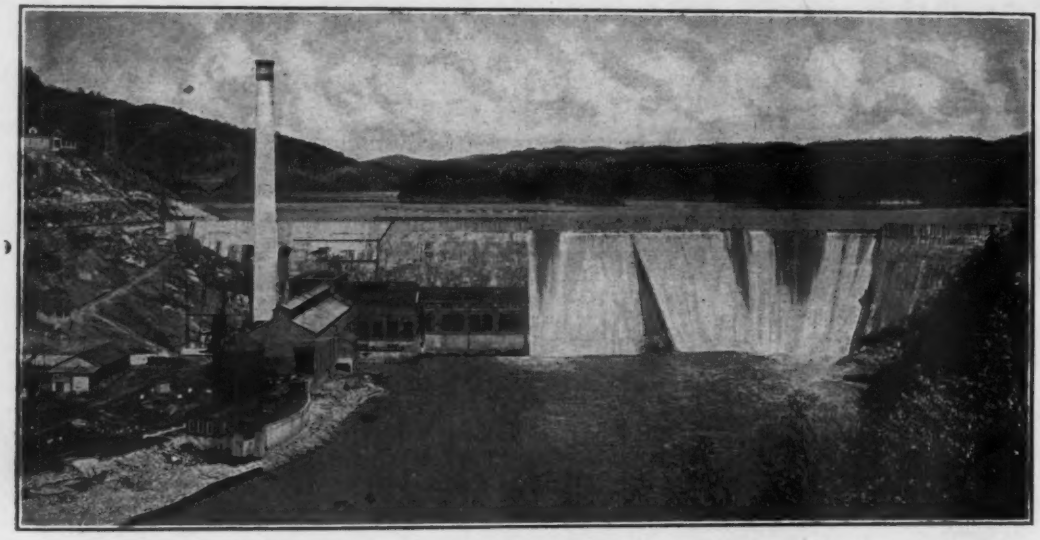
Let us arm you with the facts. If you will write us, the whole matter will be presented to you, in such form that you may in turn present it to the supply concerns with whom you deal.

In the interest of your own mill, and the entire Southern textile field—get the facts and put them before the machinery people at once. *Write to*

INDUSTRIAL BUREAU
1269 Chamber of Commerce

ATLANTA

Industrial Headquarters of the South



Combination hydro-electric and steam reserve plants of The Tennessee Electric Power Company on the Ocoee River in East Tennessee.

There's Plenty of Hydro-electric Power Available in Tennessee

Power to turn the wheels of industry is available in ample quantities in Tennessee.

Textile manufacturers locating in this section are not confronted with the problem of investing thousands of dollars in power plant equipment. Hydro-electric power is at their beck and call, thereby releasing new capital for the installation of facilities for increased production.

Electric power in Tennessee has proved its advantages in every line of industry. It can be purchased for less than the individual manufacturer can make it. And the service is adequate, dependable and thoroughly reliable.

The illustration shows only one of the power plants in The Tennessee Electric Power Company's system. The combined rating of the company's present steam and water power stations is 269,700 horsepower, with applications pending before the Federal Power Commission for the further development of 592,500 horsepower in the upper Tennessee River basin—aside from Muscle Shoals.

With resources like these and its interconnections with other power companies of the Southeast, The Tennessee Electric Power Company is in position to guarantee ample and continuous power service to new industries locating in its territory. Textile executives interested in southern locations are invited to write us for complete information about Tennessee.

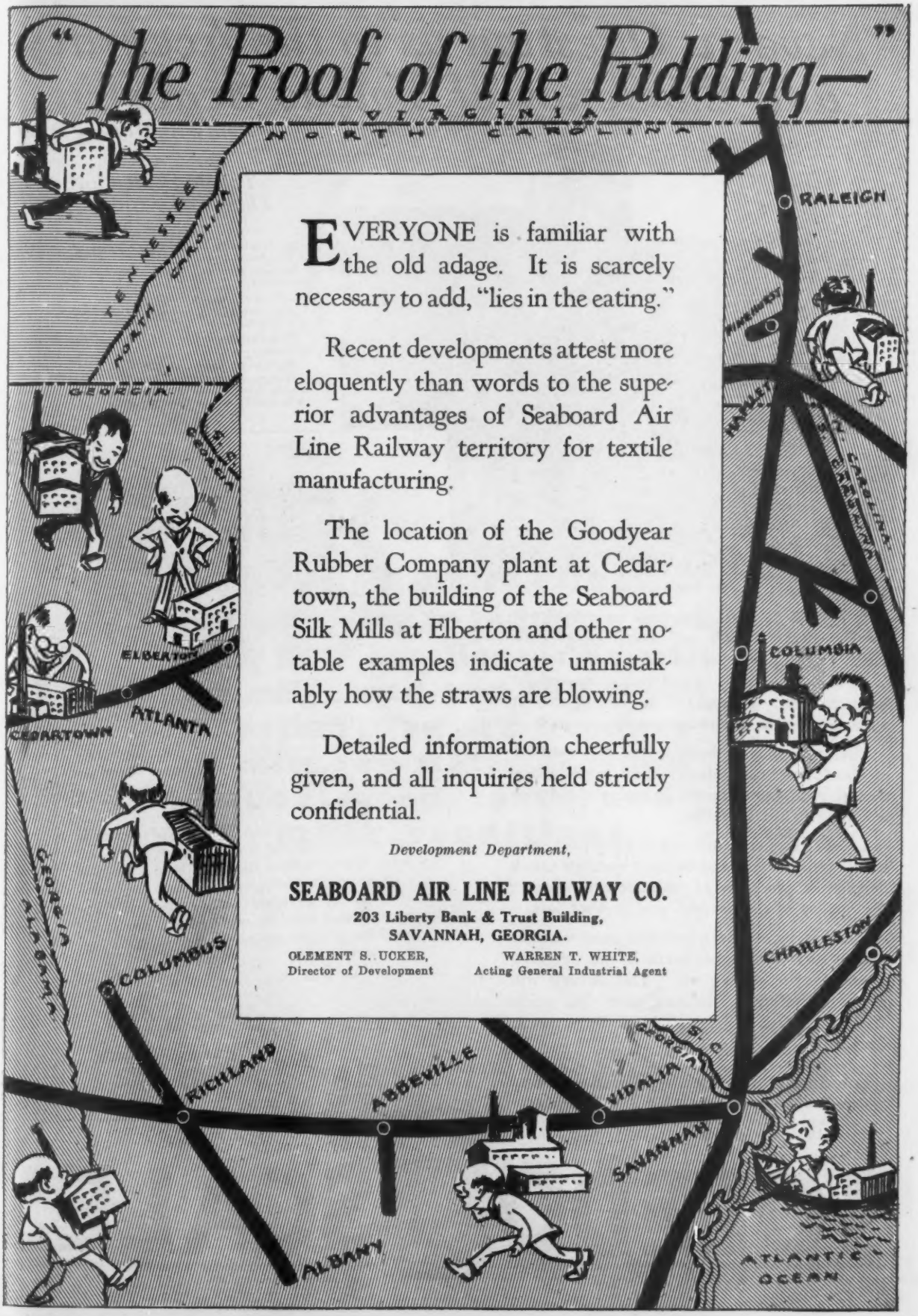
Announcing Our New Industrial Department

The Tennessee Electric Power Company has recently established an industrial bureau for the specific purpose of furnishing manufacturers and executives interested in southern locations with detailed information about labor, fuel, power, transportation facilities, plant sites, banking accommodations and other pertinent data of Tennessee.

The new department with headquarters at Chattanooga is in charge of R. C. Leonard, a native Tennessean, who has had ten years' experience in industrial engineering work, embracing practically every type of manufacturing enterprise in the state. Much of Mr. Leonard's time will be spent in northern and eastern centers on which occasions he will be available for personal consultation with executives interested. Requests for information should be addressed to the company at Chattanooga.

The Tennessee Electric Power Co.

Chattanooga, Tennessee



EVERYONE is familiar with the old adage. It is scarcely necessary to add, "lies in the eating."

Recent developments attest more eloquently than words to the superior advantages of Seaboard Air Line Railway territory for textile manufacturing.

The location of the Goodyear Rubber Company plant at Cedartown, the building of the Seaboard Silk Mills at Elberton and other notable examples indicate unmistakably how the straws are blowing.

Detailed information cheerfully given, and all inquiries held strictly confidential.

Development Department,

SEABOARD AIR LINE RAILWAY CO.

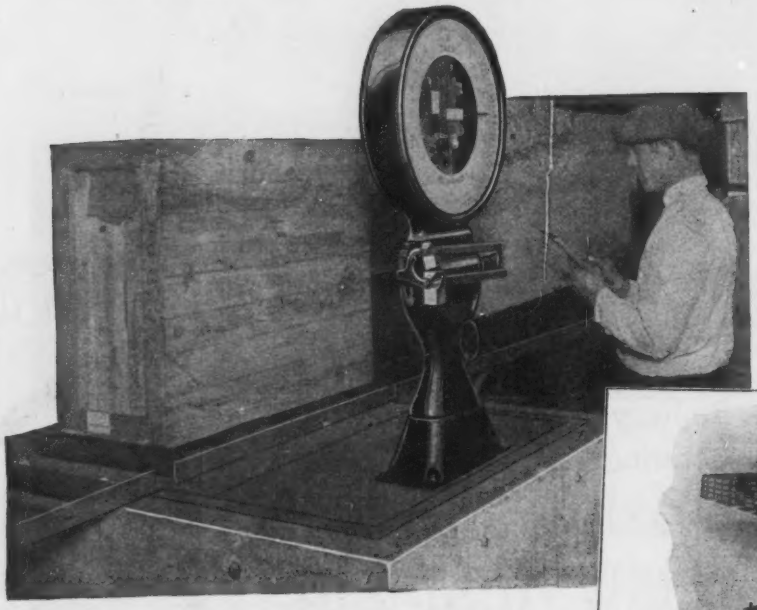
203 Liberty Bank & Trust Building,
SAVANNAH, GEORGIA.

CLEMENT S. UCKER,
Director of Development

WARREN T. WHITE,
Acting General Industrial Agent

"Never a Question as to the Accuracy and Efficiency of Toledo Scales"

—Real Silk Hosiery Mills



Toledo Scales for The Textile Industry

Determining weight per yard of fabrics in the bolt or roll.

Weighing dyes and bleaches for compounding.

Determining dockage.

Determining percentage of moisture in raw stock.

Computing weight of dozen from weight of one.

Weighing bales or laps.

Hanging, portable, overhead track, auto truck, bench and platform scales ranging in capacity up to thirty tons.

WITH hardly a pause on its way "from mill to millions," boxed ***Real Silk*** product passes over the platform of the Toledo Scale shown above. The exact shipping weight is automatically pointed out in plain figures on a dial five feet in circumference.

The scale shown above is one of a number of Toledos especially designed for inter-departmental, production-control and general-purpose weighing in textile mills.

Toledo automatic dial scales keep pace with textile mill volume, and by their accurate check during the processes of manufacture preserve the quality of the process, and prevent loss.

A survey by a Toledo man will show whether time is lost or mistakes made in the weighing operations in your plant. This survey will cost you nothing. It may save you much. Kindly address Industrial Sales Department, Section L.

Toledo Scale Company, Toledo, Ohio

Canadian Toledo Scale Co., Limited, Windsor, Ont.

Manufacturers of Automatic Scales for Every Purpose

Offices and Service Stations in 106 Cities in the United States and Canada

Toledo Scale Company,
Toledo, Ohio.

The writer would like to take this opportunity for expressing to you his appreciation of the service and efficiency we are receiving from all of the Toledo scales in our Plant.

We have a large number of Toledo scales in our Mills, all the way from the finest to the real heavy type and there has never been a question arising as to their accuracy and efficiency. Their service, as regards testing, etc., has really been all that could be expected and our recent purchases of your equipment, we feel, is its best recommendation.

Very truly yours,
J. H. Brumley
Superintendent.

TOLEDO SCALES

NO SPRINGS HONEST WEIGHT

Georgia offers exceptional opportunity to industry seeking new location. We will gladly send you full information in regard to power rates, raw material, transportation, taxes, and labor conditions.

GEORGIA RAILWAY AND POWER CO.

ATLANTA

NEW YORK OFFICE, 120 BROADWAY

If You Had It Made to Order

Benjamin Porcelain Enameled Steel Reflectors were among the first of this line to appear on the market. Always in the forefront, their development is the result of the research of illuminating engineers, designers, chemists and production experts.

If you had your reflectors made to order today, it is doubtful if they would embody more merit and advantage or be more suitable to any requirement than will be found in the standard Benjamin Industrial Lighting Equipment.

Some of the many features which distinguish Benjamin industrial lighting equipment are:

(1) Crysteel Porcelain Enamel, a reflecting surface familiar to users of porcelain enameled equipment as the mark of highest quality possible.
(2) Extra heavy X type weatherproof separable fittings.
(3) Benjamin Lamp Grip in keyless and pull-chain sockets, which prevents lamps from shaking loose under vibration.
(4) "Inner-Pull" Chain Sockets, with the straight-down, inside pull.
(5) Self-Locking Socket, which prevents theft or unauthorized removal of lamps.
(6) Shock-Absorbing Socket, for protecting lamps under heavy vibration.

Aside from these superlative mechanical and electrical features, there is a shape and design to meet any industrial requirement. For installation indoors and out. For extremely hot and dry, or very wet places. For places where there are dust and dirt, gaseous fumes, acid vapors, explosive mixtures. For the ordinary run of factory installation, or where the nature of the business calls for something extra rugged to withstand hard service.

For any industrial lighting requirement, our catalog No. 24 will be found to be a mine of information. Our nearest office will gladly forward a copy on request.

RLM
ELECTRICAL TESTING LABORATORIES

The RLM is not the mark of a reflector shape. It is an indication of superior lighting efficiency; the result of correct design and manufacturing. A reflector made to serve and fit for enduring service. A reflector without this label is not an RLM.

Benjamin Electric Mfg. Co.

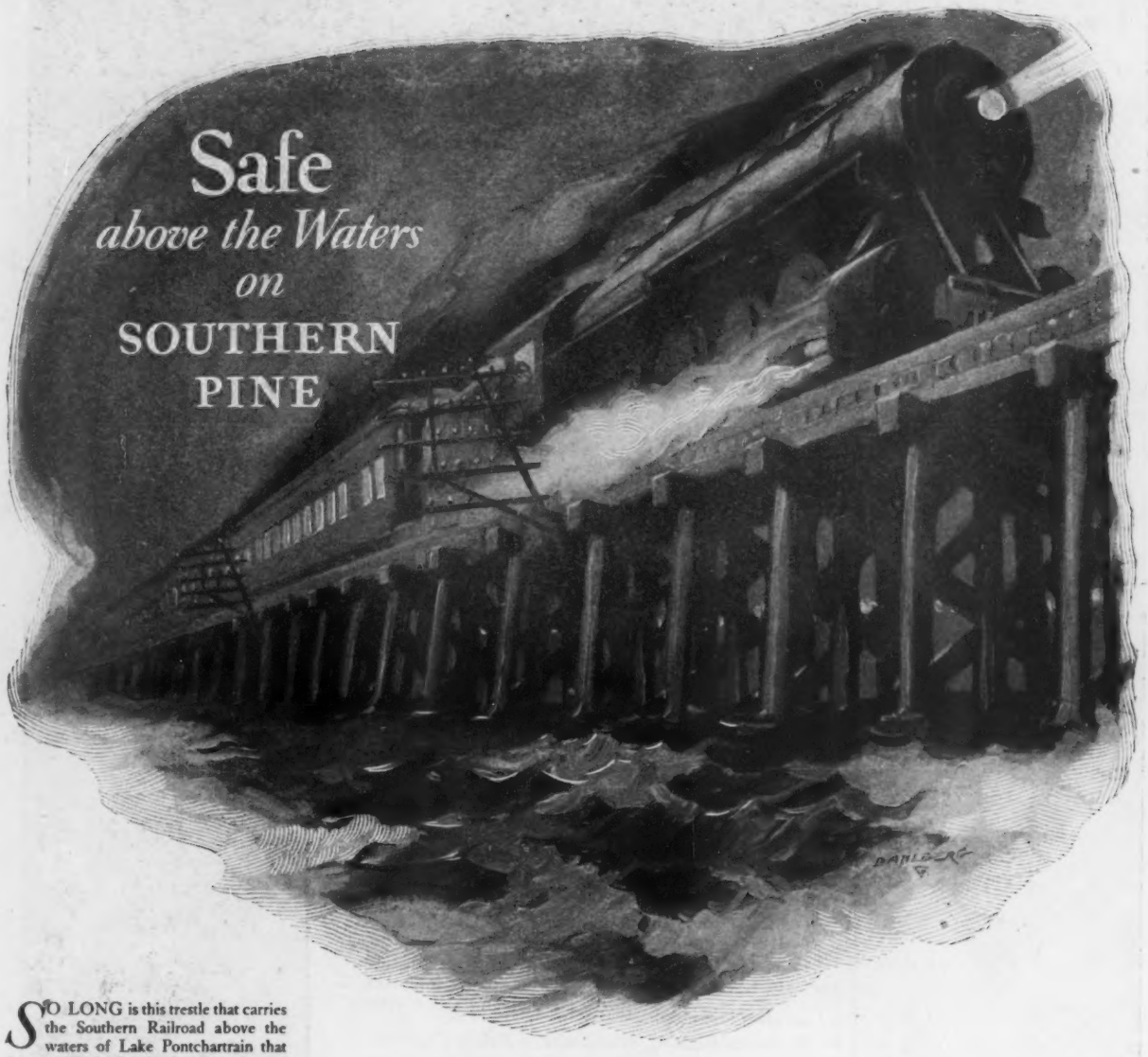
New York: 247 West 17th Street
120-128 S. Sangamon Street Chicago
San Francisco: 448 Bryant Street

Manufactured in Canada by the Benjamin Electric Mfg. Co. of Canada, Ltd., Toronto, Ontario

Benjamin-Starrett Panel Boards

BENJAMIN
TRADE MARK

Benjamin Industrial Howlers



SO LONG is this trestle that carries the Southern Railroad above the waters of Lake Pontchartrain that the receding land fades from the view of the passenger on the observation platform before land is reached on the opposite side, over five miles away.

Here, for forty-three years, human life and valuable property have depended for safety upon the structural strength of Southern Pine—the wood of the trestle.

Of risk there is none, because science has determined the dependability of Southern Pine. In laboratory and in actual construction, Southern Pine has proved itself supreme in strength—in modulus of rupture, in modulus of elasticity, in shearing resistance and crushing strength. A hundred and thirty thousand tests, in one laboratory alone—the Forest Products Laboratory, maintained by the U. S. Government at Madison, Wis.—form the basis of these statements upon which engineers and architects specify Southern Pine with exact knowledge and complete assurance.

A layman may wonder at the uses to which Southern Pine is put. A layman might be confused with reports of testing laboratories. But to the technical man, there is nothing surprising in the striking uses of Southern Pine. To the technical man, the tables of strength are as plain as signs along the highway are to the motorist.

* These letters at the right of "SPA" identify the grade. The designation here is one of 15 grade-marks appearing on lumber from Southern Pine Association mills.

Whatever your structure, whatever your need of wood in it—the strength of Southern Pine is a matter of importance to you.

Wherever you are, east of the Rocky Mountains, the nearest lumber dealer has Southern Pine in his yard. Wherever you buy, you may buy with assurance, for there is now available from Southern Pine Association mills, Southern Pine that is Trade-marked and Grade-marked.

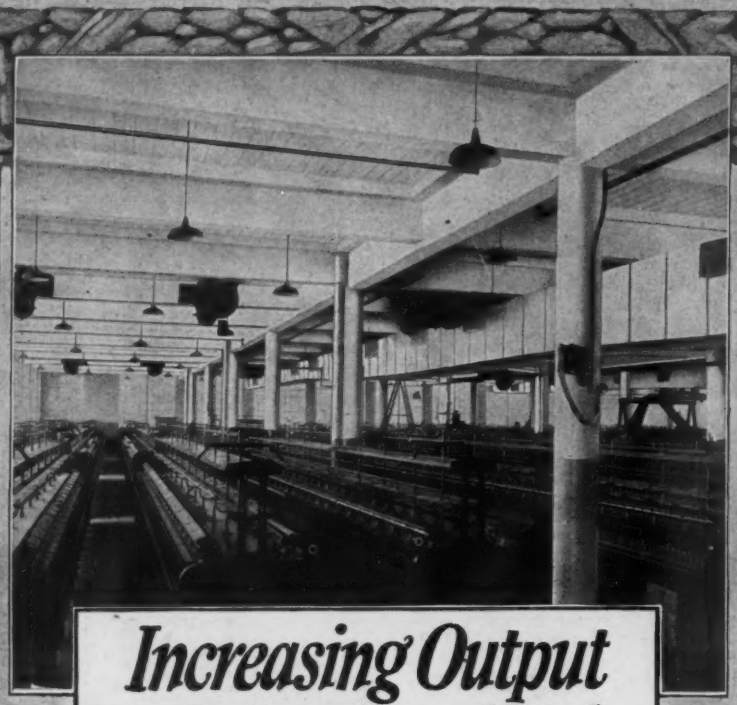
No other wood has the structural strength of Southern Pine, and your future supply is assured by the billions of feet still standing and the thousands of acres of young trees being protected throughout the South.

Southern Pine
What It Is—What It Is Used For

a valuable book, discusses the stresses to which the wood in your structure may be subjected, and recommends the correct use of Southern Pine. Recently published. Free. Send for it. Build of Southern Pine—the Supreme Structural Wood.

Southern Pine Association
179 Interstate Building
NEW ORLEANS, LOUISIANA

SOUTHERN PINE—*THE SUPREME STRUCTURAL WOOD* OF THE WORLD



Increasing Output
with Spray Gun and Brush

No single factor contributes in larger measure to increased and improved quality of output than light, efficiently diffused by an interior white paint.

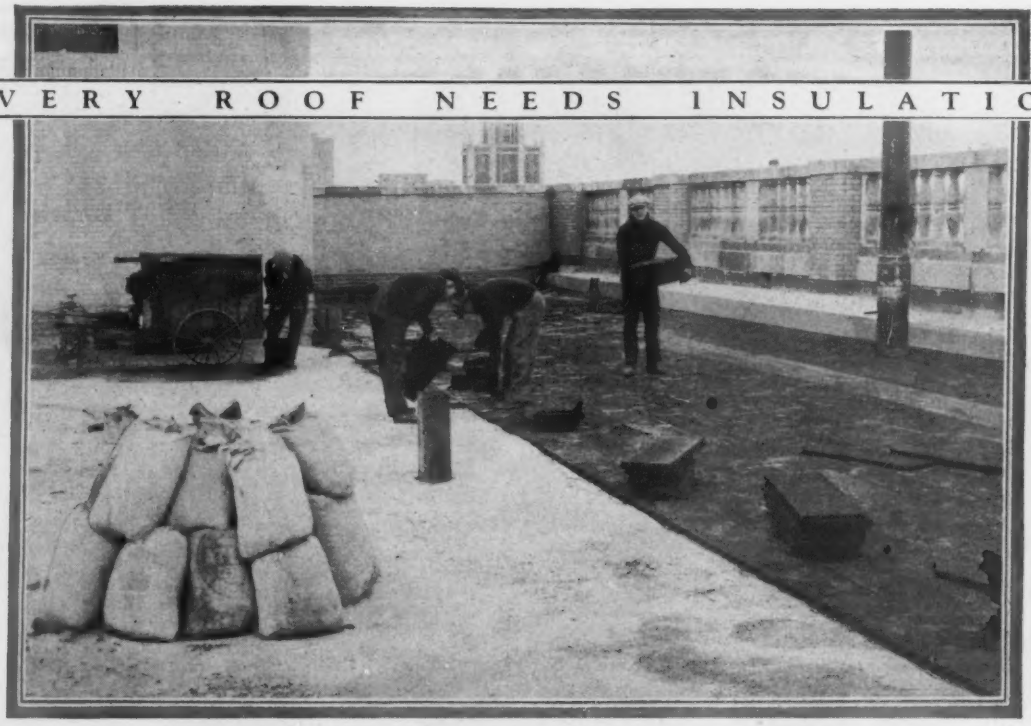
It is a fact of real significance that Arco-Rays is so generally specified for use on walls and ceilings where conditions are unusually severe or where work of exacting accuracy is required.

Engineers dictating maintenance policies in plants whose products are recognized as world's standards, acknowledge Arco-Ray's superior durability, light-diffusing qualities and lasting pure whiteness.

THE ARCO COMPANY, CLEVELAND, OHIO
Paints . Varnishes . Enamels . Lacquers 33

ARCO-RAYS
"LENGTHENS YOUR DAYS"
An Interior White Paint

EVERY ROOF NEEDS INSULATION



Laying 14,000 sq. ft. of Armstrong's Corkboard on a concrete roof deck

Will Cold Weather Make Your Ceilings Sweat?

Send for this book. It contains the whole story of roof insulation to prevent condensation. There is no charge.

NOVEMBER'S chill is a reminder in many mills that ceilings will soon begin to sweat and drip. But there is no worry on that score in mills that have Armstrong's Corkboard on their roofs.

Insulating with Armstrong's Corkboard makes the roof a nonconductor of heat and so keeps the ceiling temperature above the dew-point, which absolutely prevents condensation, or sweating. Temperature and humidity are more easily controlled and the fuel saving alone of a few years more than pays for the insulation.

Any type of roof—wood, concrete, or metal flat or sloping—can be easily insulated with Armstrong's Corkboard. It is laid directly on the roof deck, or over the old roofing. The new roofing is then laid in the regular way on the insulation. With Armstrong's Corkboard the full thickness required to stop sweating can be laid in a single layer. Furthermore, it is a moisture-proof, fire-retarding material that will not buckle or swell.

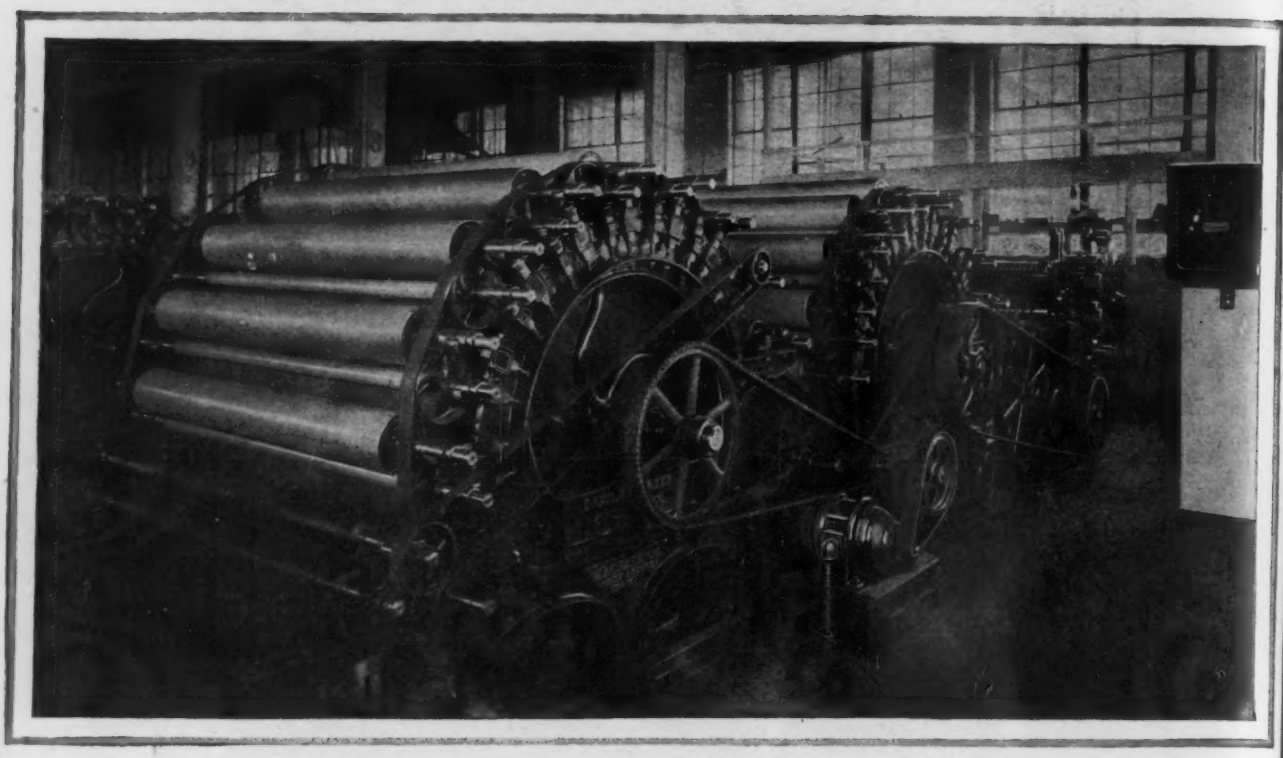
The fact that your mill is already built is no obstacle. You can easily insulate the roofs of your present buildings with Armstrong's Corkboard.

Reg. U. S. Pat. Off.

ARMSTRONG CORK & INSULATION COMPANY
(*Division of Armstrong Cork Company*)
185 Twenty-fourth Street, Pittsburgh, Pa. McGill Bldg., Montreal, Que.
Armstrong Cork Company, Ltd., Sardinia House, Kingsway,
London, W. C. 2, England
Branches in the Principal Cities of the United States

Armstrong's Corkboard Insulation

for the Roofs of All Kinds of Buildings



For *Individual Drive* of Cards—

For many years the driving of cotton and woolen cards did not follow the rapidly growing trend of individual motor applications, which had improved other textile machinery. Now G-E engineers have provided special motors with suitable control equipment for this purpose. Both chain and gear drives are used. G-E equipments for driving cards are designed for the proper acceleration of these heavy, slow-moving machines.

Communicate with your nearest G-E office, and textile mill specialists will bring you full information and prompt service as to G-E Motorized Power for cards.

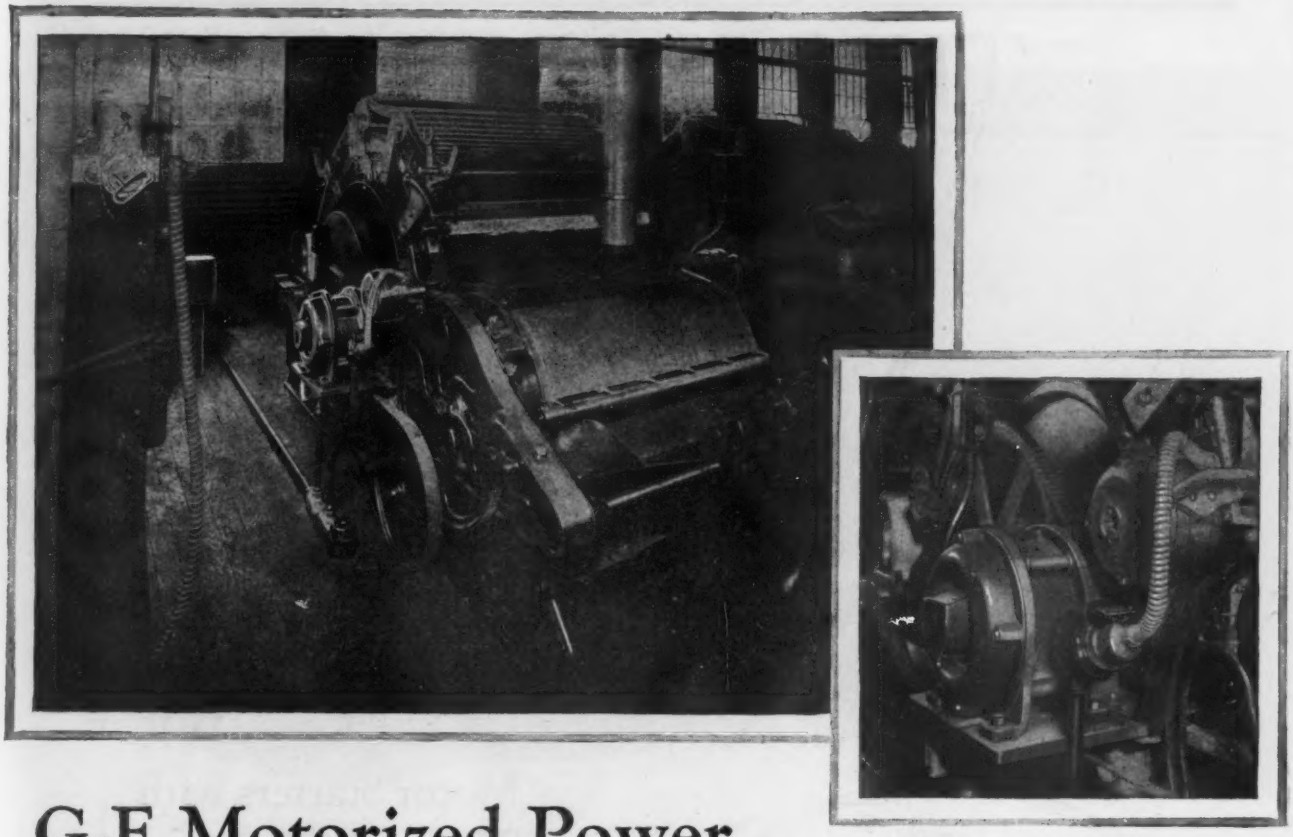
G-E Motorized Power is more than a motor or its control—it is a practical and economical application of electric power. "Built in" or connected to all types of textile machines, G-E Motorized Power provides lasting assurance that you have purchased the best.

Motorized Power
—fitted to every need

204-34B

GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.



G-E Motorized Power

Some of the advantages of G-E Motorized Power for cards—

The start of the card is improved with the individual motor—it accelerates more evenly than with the ordinary belt drive, for the motor picks up the load with a positive, gradual acceleration.

More production is obtained—individual motor drive is certain. Belt slippage is eliminated.

Individual motor drive does away with all overhead shafting and belting, making a much cleaner card room. Dripping of oil from shafting, and static electricity from belting, always troublesome in a card room, are eliminated.

To reverse the card, it is necessary only to move the handle of the reversing switch—where, formerly, removal and crossing of belting necessary to change the rotation was always troublesome and hazardous.

The omission of belts and shafting improves lighting and general working conditions. This results in higher mill efficiency.

201-34H

ELECTRIC

SALES OFFICES IN PRINCIPAL CITIES

THIS IS HOW

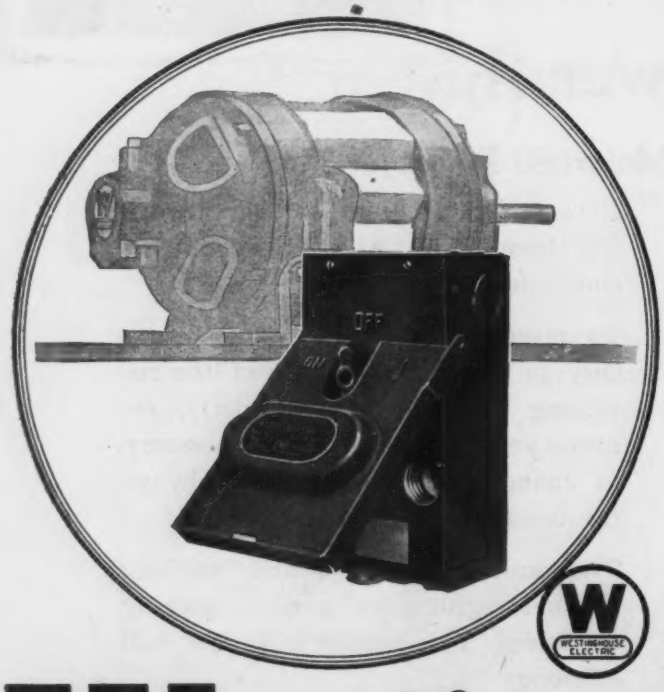
To Select the Right Thermal Cutout for a Starter

THERMAL cutouts are made in two types, plug and cartridge, the latter for use where very severe starting conditions are met and with direct current motors.

The plug type is used on motors up to 5 hp. except when the load is unusually severe, in which case the cartridge type is used. Select this cutout on the basis of two factors: the starting conditions of the motor, and the amperage at the motor terminals.

The cartridge type is used for motors over 5 hp. and where the starting load is very heavy. The longer time-lag of this cutout makes it essential for motors taking a long time to come up to speed. Select cartridge cutouts of the same ampere rating as the ampere per phase rating of the motor, or the next larger cutout.

For Full Safety—Use Westinghouse WK Motor Starters with Thermal Cutouts.



Every motor in your plant, from a fraction of a horsepower to 7½ hp. a-c. can be protected by a Westinghouse motor starter. It will give absolute protection both to motor and operator.

Write our nearest district office for your copy of the New ABC of Safety Switches, a book that has complete information about Westinghouse motor starters, and gives you tables for selecting both the proper starter and the proper cutout for any application.

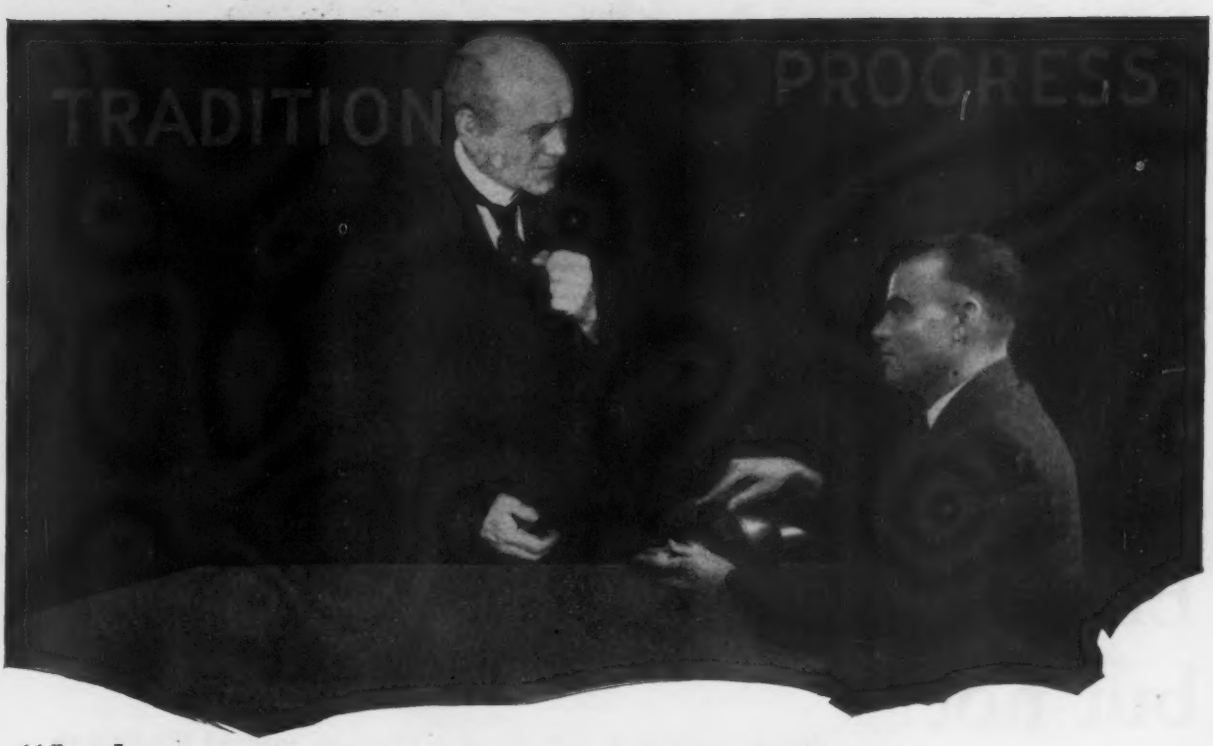
Westinghouse Electric & Manufacturing Company
Merchandising Department Mansfield, Ohio

Westinghouse

X87877-

Motor Starters

Pop Gets Hot About a Hot Motor



"Lad—

I'm running to the ground every one of these shutdowns we've had on the machines. They're nearly all due to your lack of regular motor inspection. Here's a case where this fan was all loose and bent. Of course the motor heated up because you didn't catch the trouble. Then you blame it on the motor."

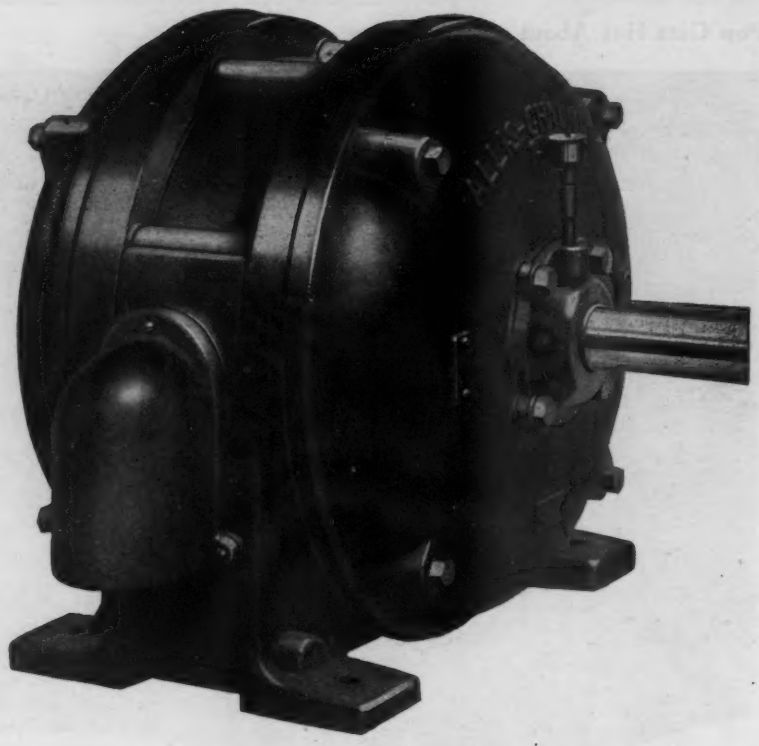
"Yes, Pop—

did you expect when you bought those motors from your non-development gang that you'd have to spend the price of the motors each year for private detective service to watch over the crimes that the maker put into them? That could never —yes, NEVER—happen to a Linc-Weld motor because they make their fans by punchings from He-Steel welded (Stable-Arc of course) smack up against the rotor end plate."

See how they do it—Page 9 of the Motor Book. If you haven't a copy write to Dept. 9-11

The Lincoln Electric Co., Cleveland, Ohio

"Linc-Weld" LINCOLN MOTOR



Note the clean lines of Allis-Chalmers Enclosed Motors. "Attached" parts are not needed. The motor housing is really its own seal, containing no openings but the small covered gauge aperture. Smallest overall size is made possible by the use of Timken Tapered Roller Bearings. Their load capacity reduces shaft length.

Completely Enclosed—but not Bulky

Bearing capacity is so much greater that shaft length averages 15% less in Allis-Chalmers motors equipped with Timken Tapered Roller Bearings. Applied to enclosed motors this means that Timkens very largely offset the usual increase in size to obtain radiation.

These bearings, free of excess friction, also lend themselves to such tight enclosure that they never need lubrication more than a few times yearly. The entire motor is just as fully protected in the Allis-Chalmers enclosed type. Solid cast end housings are fitted with machined precision. *Gone are the old, crude, easily damaged covers and gaskets.*

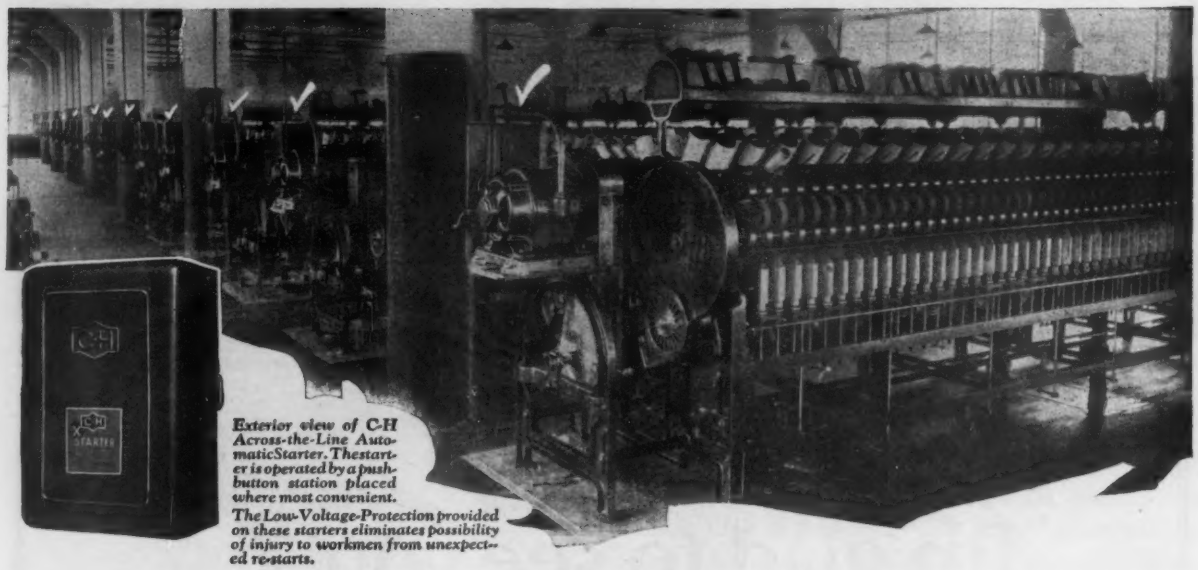
Clean and compact in design, Allis-Chalmers enclosed motors with Timken Bearings are permanently dust tight and moisture-proof, just as they are quite permanently wear-proof. Friction, thrust, and shock are defeated by the greater load area of Timkens; by their tapered design; by their steel-to-steel *rolling* motion; and by the improved starting properties.

Such bearings constantly maintain the full gap. The rotor also is insured by A-C silver brazed bars. Distortion is unknown in A-C cores. Insulation is exclusively processed to last for the life of the motor. And electric steel is used wherever possible as the foundation of Allis-Chalmers motors. In every type, at every point they beat down motor costs.

ALLIS-CHALMERS MANUFACTURING CO., MILWAUKEE

District Sales Offices in all Principal Cities

ALLIS-CHALMERS MOTORS



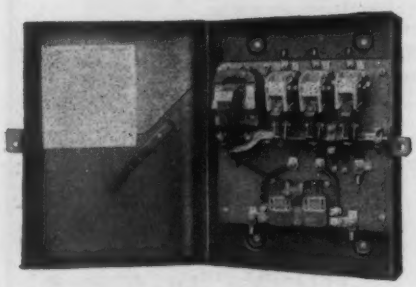
Exterior view of C-H Across-the-Line Automatic Starter. The starter is operated by a push-button station placed where most convenient.

The Low-Voltage-Protection provided on these starters eliminates possibility of injury to workmen from unexpected re-starts.

Reduce idle machine time with C-H "X" Starters—

Simplifies Your Stock Problem

C-H "X" Starters are made in 40 and 80 ampere sizes. By simply changing the heater coils the same starter may be used for any size motor within capacity.



The new 80 ampere size. Note the heavy, substantial switching mechanism and the strong magnetic blowouts that prevent flash-overs and arcing.

All C-H "X" Starters are easily installed —just attach power lines at top, and motor leads at the bottom.

IT'S the unnecessary stops that cut down production. Take any one of your motor driven machines for example:

How many times is this machine unnecessarily stopped by fuses blowing during the momentary overloads at starting? With a C-H "X" Starter it's different. Overloads of short duration are permitted without cutting the motor from the line; but should the *motor temperature* rise beyond the safe value, the Thermal Overload Relay in the "X" Starter instantly opens the motor circuit.

Fuses that really protect the motor will cause unnecessary stops. A Cutler-Hammer "X" Starter operating on the principle of thermal rise, stops the machine only when the safety of the motor demands it.

Your machines are thus kept operating. You get full motor protection without loss of time.

There are other advantages, too. Smaller motors can be used —and run safely at full capacity. This not only reduces motor investment, but eliminates the adverse effect on the power-factor caused by large motors running at less than full load.

In the interest of saving time, and protecting men and equipment you should investigate the advantages of these starters. Write today for full information.

The CUTLER-HAMMER Mfg. Co.

Pioneer Manufacturers of Electric Control Apparatus
1221 St. Paul Avenue
MILWAUKEE, WIS.

CUTLER C-H HAMMER

Industrial Efficiency Depends on Electrical Control

"I'm glad to see you, Mr. Johnson"

Mr. Johnson is welcome because he is not merely another handshaker. He has always real news and definite ideas to contribute, and he brings to a conversation a fair-minded attitude and a keen intelligence.

He has a first-hand knowledge of the field, and of its latest developments. He seems to be able to see things from your side of the fence, too, and often offers many a workable suggestion.

Many men who welcome such a caller are neglecting interviews of even greater helpfulness—interviews with many Johnsons instead of one. Can you afford to miss "regular appointments" with the A.B.P. paper or papers that cover your field of industry?

Set aside—now—a definite time to go through your business papers carefully. You will find that it pays to set a time to go through every issue.

The membership of a publication in the Associated Business Papers, Inc. means that it conforms to the highest standards of editorial and advertising practice.

The editorial matter, written by experienced men who know the field and its needs, is measured by the standard: "Is it real news?" The paper is pledged, as all A.B.P. members are, to consider first the interests of the subscriber.

Readers can depend upon the character of advertising in an A.B.P. publication, and they cannot afford to neglect the advertising pages. Here are many practical suggestions for greater plant economy and more efficient operation that may well prove of great value in keeping abreast of developments in the fields of equipment and materials.

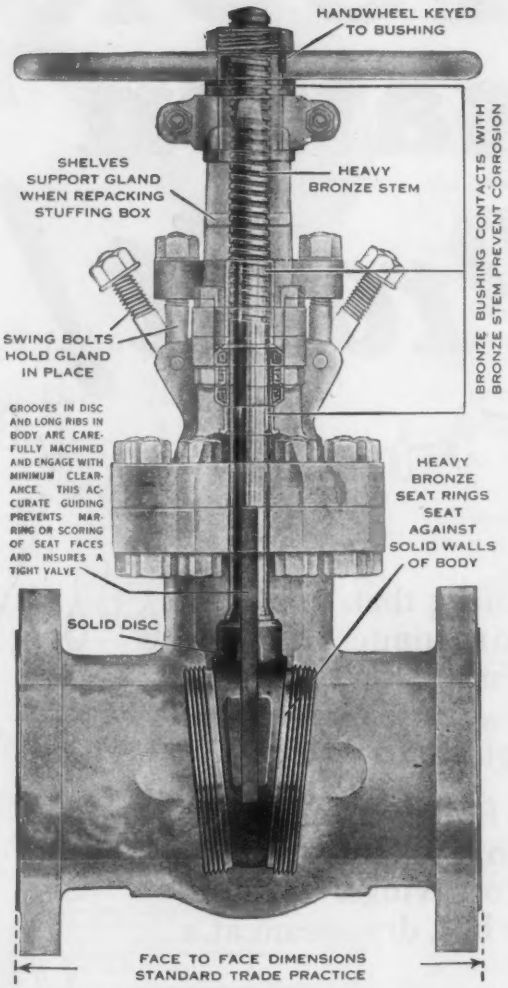
THE ASSOCIATED BUSINESS PAPERS, Inc.
Executive Offices: 220 West 42nd St., New York, N.Y.

A.B.P.

An association of none but qualified publications reaching 54 fields of trade and industry.

"COTTON" is a member of The A. B. P.

Inside Facts—


HANDWHEEL KEYED TO BUSHING
SHELVES SUPPORT GLAND WHEN REPACKING STUFFING BOX
HEAVY BRONZE STEM
BRONZE BUSHING CONTACTS WITH BRONZE STEM PREVENT CORROSION
SWING BOLTS HOLD GLAND IN PLACE
GROOVES IN DISC AND LONG RIBS IN BODY ARE CAREFULLY MACHINED AND ENGAGE WITH MINIMUM CLEARANCE. THIS ACCURATE GUIDING PREVENTS MARRING OR SCORING OF SEAT FACES AND INSURES A TIGHT VALVE
HEAVY BRONZE SEAT RINGS SEAT AGAINST SOLID WALLS OF BODY
SOLID DISC
FACE TO FACE DIMENSIONS STANDARD TRADE PRACTICE

LUNKENHEIMER
IRON BODY BRONZE MOUNTED GATE VALVE

Standard .....125 lb. W. S. P. 2 to 24 in.
Heavy .....175 lb. W. S. P. 2 to 16 in.
Extra Heavy...250 lb. W. S. P. 1½ to 18 in.

Also procurable in the Quick Operating Pattern, and in the All-Iron Pattern for handling solutions which attack bronze but not iron.

Which are influencing discerning valve users to insist upon the installation of

LUNKENHEIMER

Iron Body Bronze Mounted Gate Valves

The sectional view shows at a glance the simplicity of design, the rigid construction, and the careful attention to manufacturing details—all of which finally determine service results and ultimate valve costs.

Is it any wonder, then, that operating executives who have experienced endless trouble and expense trying to keep their gate valves tight, have enthusiastically accepted the Lunkenheimer design as a worth-while development in gate valve construction, and a solution of their gate valve problems?

Wherever Lunkenheimer Gate Valves have been installed, they are aiding materially in reducing operating costs, because they require very little attention after installation; they stay tight, and maintenance expense is held to a minimum.

Lunkenheimer manufacturing facilities insure a complete stock of all sizes at all times. Distributors are located in all industrial centers and can fill your requirements promptly from stock.

Complete information is contained in Gate Valve Book, F. 511, a copy of which will be sent upon request without any obligation on your part.

JUST FILL IN AND MAIL THE COUPON

AMERICA'S BEST LUNKENHEIMER "QUALITY" SINCE 1862

THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI, OHIO, U. S. A.
NEW YORK CHICAGO BOSTON LONDON
EXPORT DEPT. 129-135 LAFAYETTE ST., NEW YORK

THE LUNKENHEIMER CO.
"QUALITY"

P. O. Box 876 Cincinnati, Ohio

Gentlemen—Send me without obligation, copy of Gate Valve Book No. 511. AK.

Name.....

Firm.....

Position.....

Address.....

9-40-10

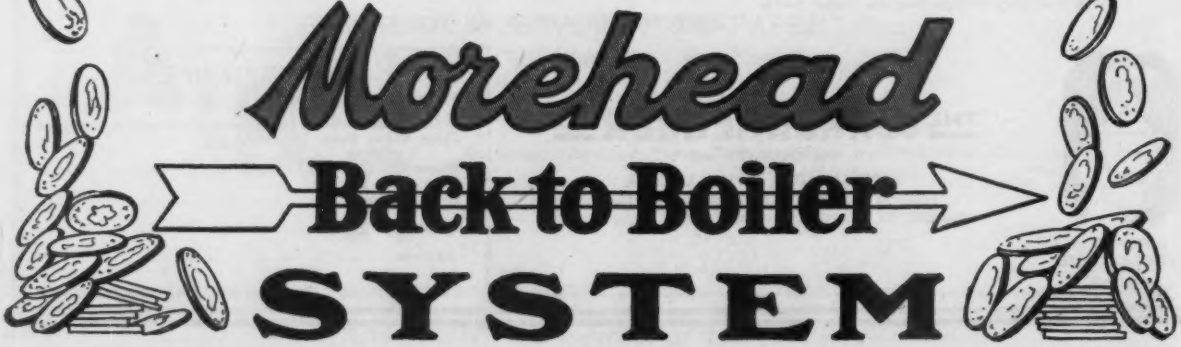
Make YOUR Condensation *Pay a Profit!*

It may be costing you more than you realize to neglect the drainage in your steam-heated equipment. Don't let condensation retard your steam circulation. Drain it properly and put it to work.

A Morehead Back-to-Boiler System will solve your condensation problems and turn excessive fuel bills into savings. And, in addition, you will have hot, dry steam at a uniform temperature.

Consultation Invited

Morehead Manufacturing Co.
Grand River at Sixteenth Detroit, Michigan
(171)



When You Consider Its Low Initial Cost

ONE of the most unexpected things about Diamond Roller Chain transmission is, that with all of its recognized advantages—*the first cost is usually less!*

The secret is its actual simplicity. The "Roller bearing" principle of its construction gives it the longer life, the higher efficiency of power transmission which follows naturally from anti-friction design. Its open simplicity gives it less of a tendency to gather splinters and dirt, minimizing the necessity of lubrication and repair.

A highly flexible, yet positive drive, applicable to high speeds—to long or short centers;—quiet—free from "slip"—Diamond Roller Chain represents the ultimate answer to the endless drive problems of *your* industry.

It will pay you to become better acquainted with it.

—and the rest of these features:

EFFICIENT ON SPEEDS AS HIGH AS 3600 R.P.M.

Rolling in contact with the sprockets—Lowered friction that results in more than 98% efficiency—a power transmission equal to that of silent chains.

Positive drive maintains a consistent speed ratio—None of the "slip" present with belts, none of the lost power and noise due to the sliding friction of worn gear teeth.

Unaffected by weather conditions and less affected by adverse operating conditions than other drives.

Compact—Occupies less space for transmission of a given amount of power.

Rolling Surfaces *Prevent Wear*

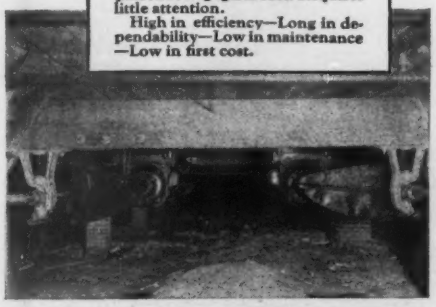
DIAMOND CHAIN

ROLLING ~ AT POINTS OF CONTACT

Flexible—Efficient on long or short centers, high speed ratios. Adaptable to a wide variety of drives.

Easy to repair, links quickly replaced at negligible cost. Requires little attention.

High in efficiency—Long in dependability—Low in maintenance—Low in first cost.



Triple Diamond High Speed Roller Chain on line-shaft drives in a South Carolina Mill. The compactness of Diamond Roller Chain and its efficiency on extremely short centers make possible its convenient installation in a very low space beneath the floor. Motor, 20 H. P., 1165 r. p. m.

TRADE MARK

Look for the Diamond on the Link

Big savings in operating costs

In textile mills throughout the country Diamond Roller Chain is effecting steady savings in operating cost through its long-wearing dependability and low cost of maintenance.

On direct motor drives to spinning frames and the like, as well as on drives from motors to line-shafts from which individual machines are driven, its frictionless operation and ability to stand up dependably at high speeds are piling up real savings from month to month.

Send for this interesting booklet.

TEAR ALONG THE ROLLERS

You may send a copy of your booklet to the address below.

Name..... Firm Name..... Address..... City..... State.....

Makers of High Grade Chains since 1890

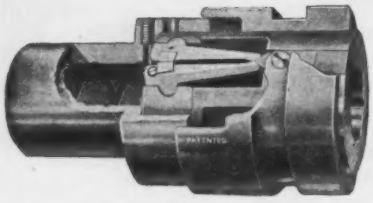
The DIAMOND CHAIN & MFG. CO. INDIANAPOLIS, INDIANA

DISTRIBUTORS: Moore-Handley Hardware Co., Birmingham, Ala.; C. T. Patterson Co., Inc., New Orleans, La.; J. W. Vaughan, Jr., Greenville, S. C.

THE JOHNSON FRICTION CLUTCH

as used on

The Weis Automatic Design Cutting and Sewing Machine



Single Clutch—Sectional

"We intend to use them right along—as they have proven very satisfactory."

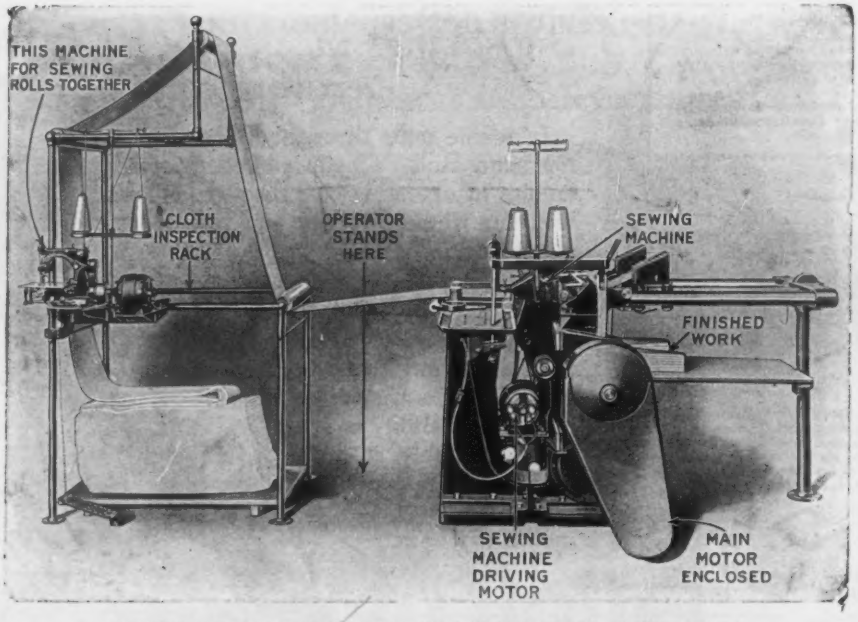
—Metropolitan Sewing Machine Corp.

Single Clutch with Pulley

On this machine a No. 2 Single Johnson Clutch is used on the main motor drive shaft. The Johnson Clutch has no equal on Textile machinery of all kinds—spinning frames, twisters, cards, looms, etc.

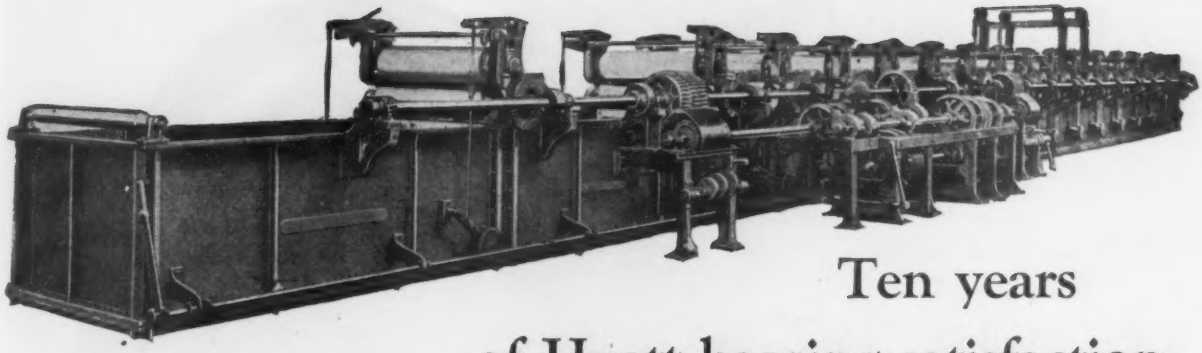
The Johnson guarantees perfect control. Instantaneous stopping, smooth starting of the machine assured. Small and compact, and requires very little space. Ideal for light power drives such as textile machines. Equip your textile machines with Johnson Clutches. Full data free. Write us.

Write for Catalog "G"

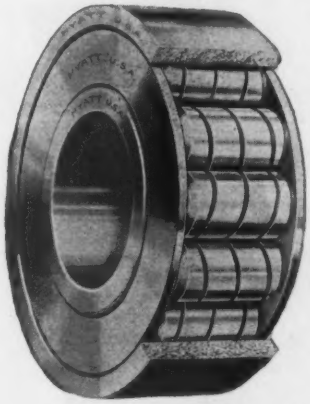


COURTESY METROPOLITAN SEWING MACHINE CORP., NYACK, N. Y.

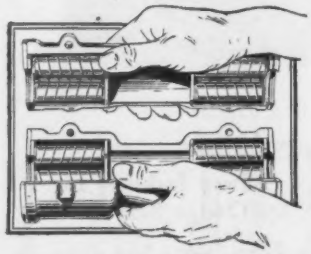
THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN



Ten years of Hyatt bearing satisfaction where constant trouble formerly was tolerated



The Hyatt Bearing for Mercerizers



Hyatt Line Shaft Bearings are Split—for Easy Installation

It is not necessary to strip pulleys, couplings, and other fittings when applying the new narrow center Hyatt Line Shaft Roller Bearing. Being split—it wraps around the shaft. It fits all narrow hangers and once applied—saves 15% of your total power bill—easily.

THE durability of Hyatt Roller Bearings operating under adverse conditions has been proved beyond question on warp mercerizers.

For ten years they have been standard on nearly all mercerizers built in this country—and in that time, few have worn out—establishing a new gauge of bearing stamina on this type of equipment.

Despite the adverse conditions under which the bearings operate, Hyatts remain in service years at a time. They impart smooth, even rolling motion—free from jerks. The rolls maintain even tensions on the warps resulting in uniform mercerizing and dyeing. Thin spots are eliminated, and the yarn delivered to the loom is of uniform quality—an important factor in the manufacture of quality cloth.

The Hyatt engineering staff is equipped and ready to help solve all your bearing problems. Full information, including drawings, on the particular textile applications in which you are interested will be sent on request.

HYATT ROLLER BEARING COMPANY

Newark Worcester Philadelphia Charlotte Detroit
Chicago Oakland Pittsburgh Cleveland

HYATT
ROLLER BEARINGS

Dodge-Timken Belt Governors Will Save Power in Textile Mills

A BELT drive needs a governor to maintain uniform and maximum contact on pulleys. It needs the correct tension to carry the load with minimum slip under varying conditions.

With the advent of the Dodge-Timken Automatic Belt governor, which is another of the series of rugged, trouble-free, power saving products, built by Dodge, industry has found another way to effect great savings. Wherever it is in use it is substantiating every claim for it.

Its application to all industry has been exceedingly successful. Above, is an illustration showing it in operation in the David Cole Co., Omaha, Neb. The Dodge-Timken Belt Governor can be applied to horizontal, angle or vertical drives. It is equipped with Timken Tapered Roller Bearings, which are designed for high-speeds, heavy loads, continous operation and severe service.

Our special bulletin, giving full particulars regarding this new Dodge-Timken development, will be sent on request.

Where Industry Is Dodge Serves

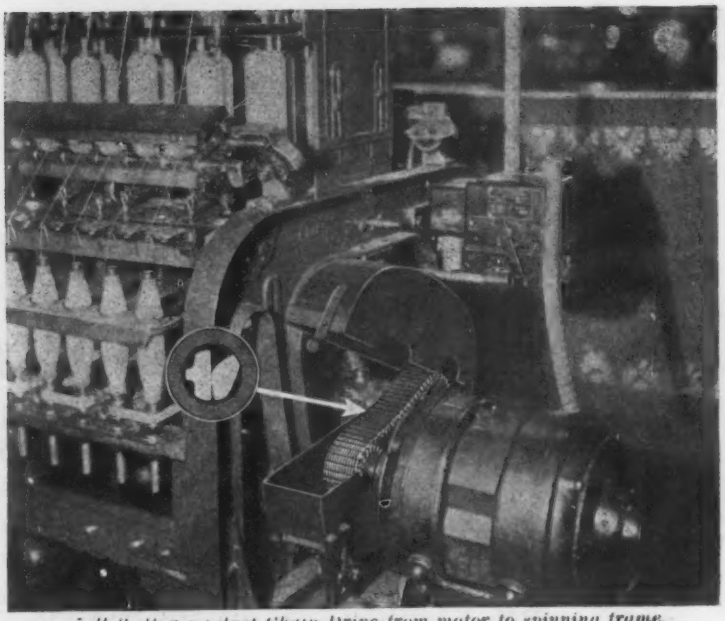
Fifteen District Sales offices located in Chicago, Milwaukee, Minneapolis, Cleveland, Cincinnati, Oneida, Boston, Philadelphia, New York, Newark, Atlanta, St. Louis, Houston, San Francisco and Portland cooperate with 500 leading mill supply and machinery dealers in making Dodge service immediately available to you.

DODGE TIMKEN

DODGE MANUFACTURING CORPORATION, Mishawaka, Indiana

Power Transmission—Material Handling—Special Machinery

In up to date mills



5 H.P. Morse Silent Chain Drive from motor to spinning frame. Driver, 1750 r.p.m.; Driven, 898 r.p.m., 9 inch centers.

The majority of modern cotton mills in the country are using Morse Silent Chain Drives to meet their power transmission requirements. They appreciate the advantages of:

Greater Production.
Better Yarns, selling at higher prices.
Lower Power Costs.
Improved Lighting Conditions.
Cleaner Mills.

Over 6,000,000 H. P. of Morse Silent Chain Drives have been installed. They are 98.6% efficient, positive, flexible and durable.

The nearest Morse Transmission Engineer can show you how modern mills are using Morse Drives.

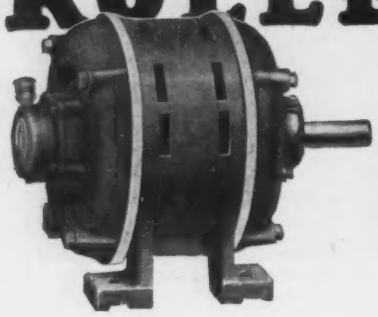
MORSE CHAIN CO., ITHACA, N. Y., U. S. A.

ATLANTA, GA.....702 Candler Bldg.
Earl F. Scott & Co.
BALTIMORE, MD.....1002 Lexington Bldg.
BIRMINGHAM, ALA.
Moore-Handley Hdwe. Co.
BOSTON, MASS.....141 Milk St.
BUFFALO, N. Y...Ellicott Square Building
CHARLOTTE, N. C.
404 Commercial Bank Bldg.
CHICAGO, ILL.....112 W. Adams St.
CLEVELAND, OHIO...421 Engineers Bldg.
DENVER, COLO.....211 Ideal Bldg.
DETROIT, MICH.....7601 Central Ave.
LOUISVILLE, KY.....516 W. Main St.
E. D. Morton Co.
MINNEAPOLIS, MINN.....413 Third St.
Strong-Scott Mfg. Co.
NEW ORLEANS, LA.
Queen & Crescent Bldg., 334 Camp St.
A. M. Lockett & Co., Ltd.
NEW YORK, N. Y.....50 Church St.
OMAHA, NEB.....727 W. O. W. Bldg.
D. H. Braymer Equipt. Co.
PHILADELPHIA, PA.
803 Peoples Bank Bldg.
PITTSBURGH, PA.....Westinghouse Bldg.
SAN FRANCISCO, CALIF., Monadnock Bldg.
ST. LOUIS, MO., 2137 Rwy. Exchange Bldg.
TORONTO, 2, ONT., CAN., 50 Front St. E.
Strong-Scott Mfg. Co.
WINNIPEG, MAN., CAN.....Dufferin St.
Strong-Scott Mfg. Co.
1154

MORSE SILENT CHAIN DRIVES

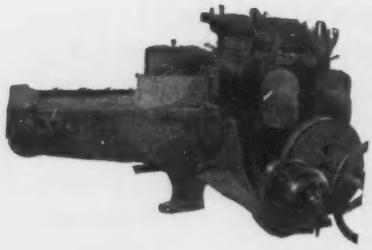
THE MORSE ROCKER JOINT

TIMKEN
Tapered
ROLLER BEARINGS



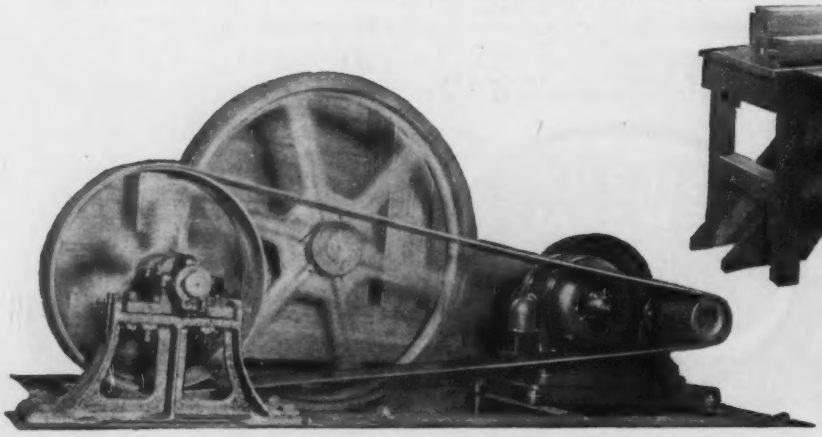
THERE are certain electric motor tasks where *any* bearings may be tolerable. Here Timken Bearings add the value of anti-friction properties—saving power—eliminating all but one or two greasings a year—improving starting conditions—*maintaining the closest gap permanently.*

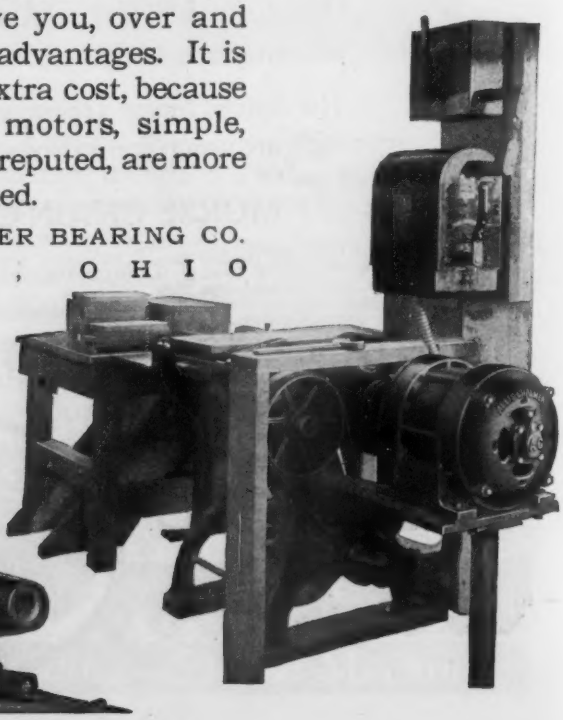
But there is many an electric motor task where *no* bearings served satisfactorily until the job was awarded to Timkens. For only Timken Bearings provide the extreme load capacity of Timken Tapered design and Timken electric steel, with *POSITIVELY ALIGNED ROLLS.*



Inherently higher resistance to thrust, shock, and every other form of wear is what Timkens give you, over and above anti-friction advantages. It is extra worth at no extra cost, because Timken-equipped motors, simple, compact and highly reputed, are more economically operated.

THE TIMKEN ROLLER BEARING CO.
C A N T O N , O H I O





Proved! Monel Metal's Cleanability Increases Production and Cuts Costs

"Onyx" Hosiery Inc.

NEW YORK OFFICE
1107 BROADWAY

WHARTON, N. J.
August 13, 1926.

The International Nickel Co.,
#67 Wall Street,
New York City.

Dear Sirs;

You may be interested in knowing that our present dyehouse, which has been in operation about eighteen months, is equipped throughout with Smith, Drum and Company Monel Metal rotary dyeing machines, and Smith, Drum and Company paddle machines, the paddles and linings of which are Monel Metal.

When compared with other metals such as Copper, etc., we find the qualities of Monel Metal to be best adapted to our uses, in the matter of production, efficiency and maintenance cost.

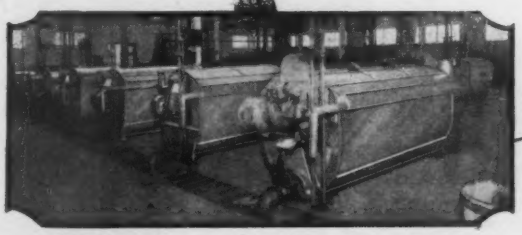
The many shades which now prevail cause a great many changes in the dye liquors, which are facilitated by the ease with which Monel Metal can be cleaned. This helps to increase our production and keep down the labor cost.

We find that our dyestuffs, which consist of Developed Blacks, Direct Colors, and Neutral Dyeing Acid Colors, have no perceptible effect on the metal, nor do we have any trouble in our methods, coming from any slight reaction which might take place between the Monel Metal and the acids used.

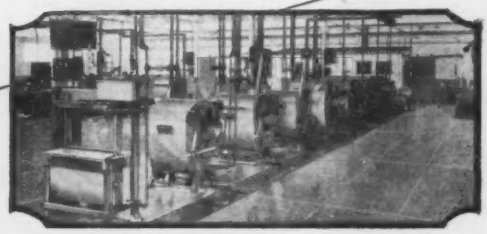
The good wearing qualities of Monel Metal, and its ability to withstand the action of dyestuffs and chemicals, give it a decided advantage over other materials in the matter of repairs or maintenance.

We also use your product in the form of dyepails, buckets, strainers, etc., with the same good results, and we are now considering the using of Monel Metal lined tubs for our soaking bath in our Throwing Plant.

Very truly yours,
"ONYX" HOSIERY INC.
Per J. Burnett Cooper



View of new dye house of "Onyx" Hosiery, Inc., Wharton, N. J. showing some of the 16 all Monel Metal Rotary Hosiery Dyeing Machines, manufactured by SMITH-DRUM & CO. OF PHILADELPHIA, PA.



Another view of "Onyx" dye house showing additional Smith-Drum Monel Metal Rotary Dyeing Machines ranging in capacity from 10 lbs. to 300 lbs. per batch.

INCO MONEL METAL TRADE MARK

MOnel metal

INCO MONEL METAL TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, 67 WALL STREET, NEW YORK CITY

MOND "Seventy"

An ALLOY of High Nickel Content Resistant to Dyes — Chemicals, Rust and Corrosion.

THE IDEAL METAL
for Textile Equipment such as:—

Washing and Scouring Machines	Steaming and Calendering Machines
Soaping Machines	Drying Racks
Crabbing Machines	Linings, Rolls, Spiders, etc.
Carbonizing Machines	Tanks, Cylinders, Drums
Tubes, Valves, Fittings, Pumps	Agitators, Reels, Shafts, etc.
Vats, Padders and Jigs	Sheets, Rivets, Castings
Dyeing Machines	Screws, Bolts, Nuts, etc.

Mond Seventy is furnished in all commercial forms—and is produced exclusively by this Company. ¶ This metal is available to every manufacturer who desires to build the best.

American Nickel Corporation
Clearfield, Penna.

A UNIFORM, COMPLETE ALLOY OF HIGH NICKEL CONTENT, MADE UNDER RIGID LABORATORY CONTROL.

BRETON MINEROL PRODUCTS

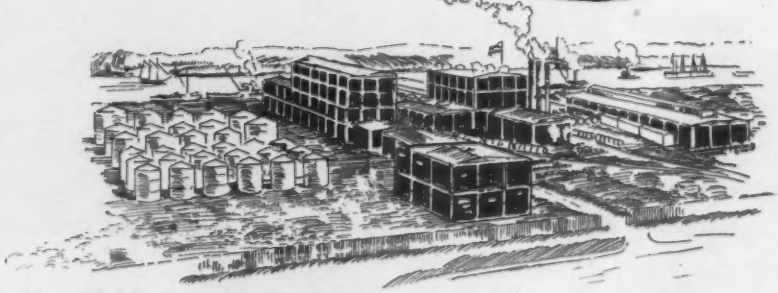
"XX" Breton Oil for Wool
"Crystal" Shear Oil
"Paragon" Governor Oil
"Paragon" Loom Oil
"RR" Spindle Oil
"Crystal" Knitting Oil
"Colonial" Motor Oil
"Ideal" Engine Oil
"650 F" Valve Oil
Brilliant Oil AX
"NWA" Transformer Oil
"Breton Minerol F"
and
"Breton Minerol Process"
Patented

BORNE SCRYMSER COMPANY
17 BATTERY PLACE, NEW YORK

THE Lubricating Products and Processes bearing our name and symbol represent more than a half-century of step-by-step advancement in the art of Lubrication.

The selection of, and concentration upon, a restricted scale of industrial application has given a rich yield —*a distinctly specialized output.*

The wisdom of such a policy is reflected in the qualifications of our line, each item of which admirably performs its intended duty.



BORNE SCRYMSER COMPANY
17 BATTERY PLACE, NEW YORK

HOUGHTON'S AID *for* Textiles

A NEW PRODUCT RELEASED FOR GENERAL SALE

HOUGHTON'S AID for TEXTILES —The Name of a New Product

THE man does not exist who can sit in the laboratory and create new products for the textile industry without the aid of the practical mill man. This is because the production of such products is largely a physical, as well as a chemical problem.

The reader must realize that, for over a half-century we have been studying the requirements of the textile industry in oils and leathers, and that HOUGHTON'S AID for Textiles is the result of this close acquaintance with the needs.

HOUGHTON'S AID for Textiles has been tested by practical mill men, cooperating with the Houghton Research Staff, in practical mill operations for over a year, and is now released for general sale.

For years there has been on the market sulphonated oils for use in the kier as softeners and solvents for the cotton waxes, in more or less satisfactory results. HOUGHTON'S AID for Textiles has exceptional solvent qualities for these waxes, and in a long series of tests we have determined that one-quarter the quantity of this new product gives the equivalent or better results than sulphonated castor oil.

In the wetting-out of cottons for dyeing, HOUGHTON'S AID for Textiles has proven very satisfactory. In the dyeing of cotton, it has taken the place of sulphonated castor oil, because of the evenness and levelness of the color that is the result.

We feel that a personal interview with a HOUGHTON MAN will be more satisfactory than correspondence on this product, therefore we suggest that you 'phone or drop a line to the address below, so that the next time our representative is in your territory, he can make a special point of calling upon you.

E. F. HOUGHTON AND COMPANY

Since 1865

DEPARTMENT OF PUBLICITY, BOX 6913

NORTH PHILADELPHIA, PA., AND ALL OVER THE WORLD

Concentration

Even "Air Castles" Cannot Exist Without Concentration—Much Less Water Softeners

If unstable visions, called "Air Castles," require concentration, think how much more vital a factor concentration is, for building success in reality. This applies to the manufacture of a product that helps other manufacturers. The producer must constantly concentrate on its development and KNOW that every move he makes is a constructive one. No one can do this better than those who specialize in the manufacture of ONE product.

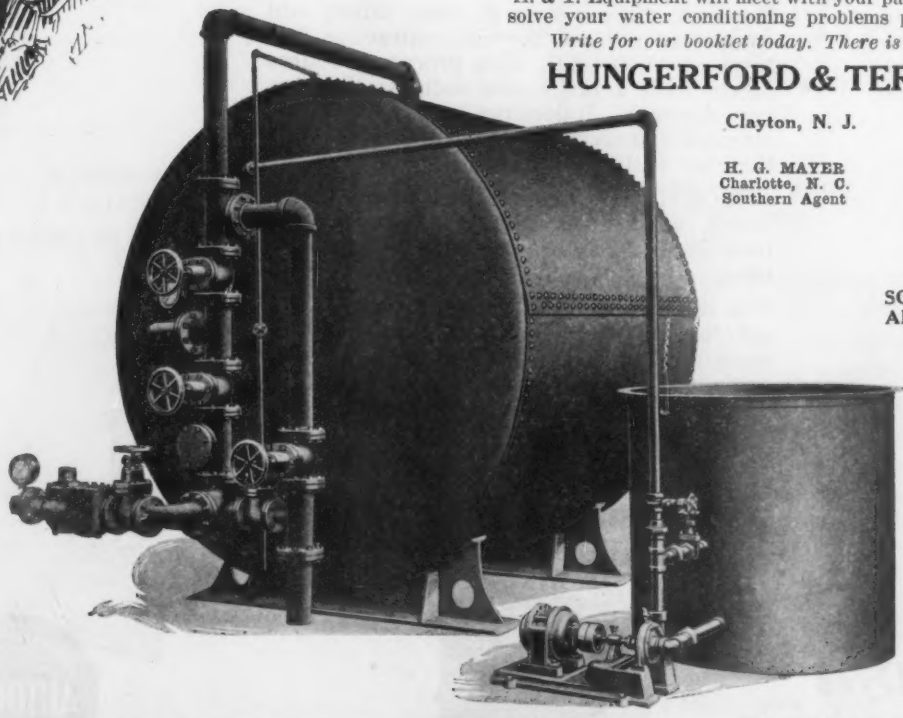
We have manufactured nothing but filters for the last one-third century. It is our life work, which explains why Inversand Softeners and Hungerford Filters have so successfully ended manufacturing troubles caused by bad water. H. & T. Equipment will meet with your particular needs, and solve your water conditioning problems permanently.

Write for our booklet today. There is no obligation.

HUNGERFORD & TERRY, Inc.

Clayton, N. J.

H. G. MAYER
Charlotte, N. C.
Southern Agent



INVERSAND SOFTENING PLANTS ARE INSTALLED IN

Revolution Cotton Mills, Greensboro, N. C. 3,000,000 gal. per day

Belmont Processing Co., 1,000,000 gal. per day

National Yarn & Processing Company 500,000 gal. per day

Boger & Crawford, 420,000 gal. per day

Miller-Smith Hosiery Co., 150,000 gal. per day

Central Franklin Process Co 150,000 gal. per day

Proximity Mfg. Co., 300,000 gal. per day

And in many other textile mills throughout the Southern States.

INVERSAND
WATER SOFTENER

AUTO GYP
Process of Dyeing

Surely There Is Economy When 6 Operations Are Eliminated

A dyeing process that can give the required results with six operations eliminated is surely economical. The AUTOGYP Process of Dyeing is especially economical—for it bleaches and dyes in one operation, saving 10 hours of valuable time.

However, the savings in time, labor, and equipment are not the only attractive features of AUTOGYP. This process produces fabric with a lustre and softness that are very desirable. It does not impair the tensile strength and service value of the fabric as is the case with lime methods.

AUTOGYP removes all dirt, cotton seed, motes and shives from the grey goods, bleaches and dyes in two and one-half hours' time.

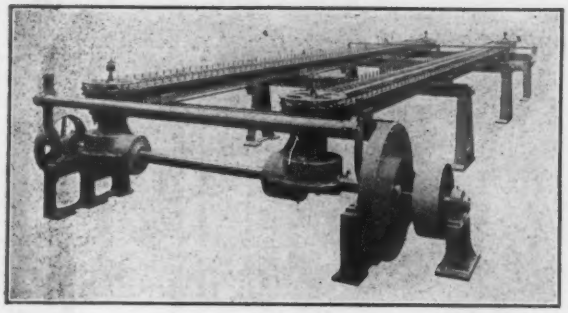
You can use AUTOGYP in your mill without the slightest change of machinery or equipment as AUTOGYP requires no special equipment and no special skill—one reel dye machine and one operator can do the work.

Send for our free booklet which explains everything, or ask for a demonstration. It will obligate you in no way.

SURPASS CHEMICAL CO., Inc.
Offices—Factory—Laboratories
1254-56 Broadway, Albany, N. Y.

It Dyes and Bleaches in One Operation

An Especially Fine Tenter For Rayon



Let us send a booklet on this Tenter

--- *light running power saving*

Here is a really new tenter—new design—new ideas of construction—all with the thought of producing a well-balanced machine—strong enough to take any reasonable overload—yet it has no excess metal. It is extremely light-running, easily operated. All parts are interchangeable. Sufficient parts are maintained at all times to make up a tenter 90′ long in either 50″ or 60″ width.

Glad to send a booklet completely describing this new tenter, which is especially fine for Rayon, Silk and other fabrics.

And if You *Dye* Rayon

you will be interested in this booklet

It concerns
A KLAUDER-WELDON
DYEING MACHINE

It describes in full detail the many features of the new Klauder-Weldon Skein Machine for Dyeing Rayon, Mercerized Cotton and Silk.

This one machine can be equipped for dyeing all three of these products in skein form.

And remember this about not only the skein dyeing machines but *all* Klauder-Weldon machines—that they always live up to what was promised for them—quality and quantity. To insure this, we supervise the erection of the skein-dyeing machine and place a man in your plant until your own organization can operate it at its greatest efficiency, and prove to you its superiority over any other form of skein dyeing.

H. W. BUTTERWORTH & SONS COMPANY

Established 1820

Philadelphia, Pa.

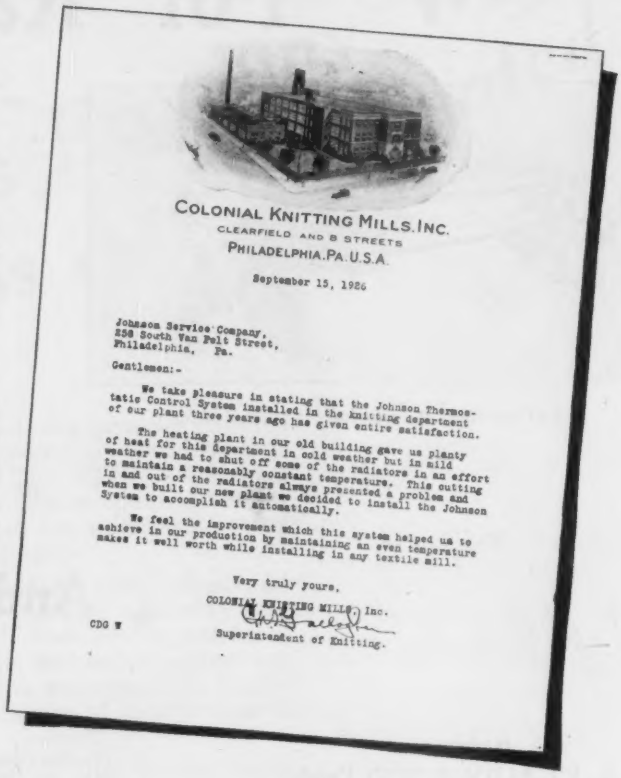
Plants at Philadelphia and Bethayres, Pa.

Providence Office:	*Canadian Rep.:*	*Southern Office:*
Turks Head Building	W. A. Westaway Co., Hamilton, Ont., Can.	1211 Johnston Bldg., Charlotte N. C.

BUTTERWORTH *Finishing* MACHINERY

Automatic Heat Control Instead of Hand Regulation of Radiators

This letter hits the nail on the head. It compares the old method of "cutting in and out of the radiators" with the new method of automatic control.



COLONIAL KNITTING MILLS, INC.
CLEARFIELD AND B STREETS
PHILADELPHIA, PA. U.S.A.

September 15, 1926

Johnson Service Company,
258 South Van Pelt Street,
Philadelphia, Pa.

Gentlemen:-

We take pleasure in stating that the Johnson Thermostatic Control System installed in the knitting department of our plant three years ago has given entire satisfaction.

The heating plant in our old building gave us plenty of heat for this department in cold weather but in mild weather we had to shut off some of the radiators in an effort to maintain a reasonably constant temperature. This cutting in and out of the radiators always presented a problem and when we built our new plant we decided to install the Johnson System to accomplish it automatically.

We feel the improvement which this system helped us to achieve in our production by maintaining an even temperature makes it well worth while installing in any textile mill.

Very truly yours,
COLONIAL KNITTING MILLS, Inc.
CDG W
Superintendent of Knitting.

One means a waste of time and labor—a waste of fuel—a hit-or-miss policy, which is at the mercy of the man who is supposed to keep tabs on the temperature and regulate the radiators accordingly. The other—Johnson Thermostatic Control—means *automatic* regulation. The "human factor" is absent. Just the right temperature is maintained for bodily comfort, for the goods in process and for the machinery.

Are YOU using Johnson Thermostatic Control? If not, let us explain its advantages. A Johnson System is an investment that more than pays for itself.

JOHNSON SERVICE COMPANY

Main Office and Factory: Milwaukee, Wis.

BRANCH OFFICES

Atlanta, Georgia
Albany, New York
Boston, Massachusetts
Buffalo, New York
Chicago, Illinois
Cleveland, Ohio
Cincinnati, Ohio
Dallas, Texas
Des Moines, Iowa
Detroit, Michigan
Denver, Colorado
Greensboro, North Carolina
Indianapolis, Indiana
Kansas City, Missouri
Los Angeles, California
Minneapolis, Minnesota
New York, N. Y.
Pittsburgh, Pennsylvania
Portland, Oregon
Philadelphia, Pennsylvania
Seattle, Washington
San Francisco, California
Salt Lake City, Utah
St. Louis, Missouri

JOHNSON TEMPERATURE REGULATING COMPANY OF CANADA, Ltd.
Calgary, Alberta; Montreal, Quebec; Toronto, Ontario; Vancouver, British Columbia; Winnipeg, Manitoba

AMONG COTTON'S READERS

C. M. Black, Superintendent,

The Borden Manufacturing Company,

Goldsboro, North Carolina.

"Your magazine is like my check every 30 days, and means practical food for another month."

C. M. Black

NATIONAL ERIE GARNET RB

An addition to our line of Direct Dyes

POSSESSES excellent solubility and is practically unaffected by metals, thereby making it well suited for use in all classes of machine dyeing.

NATIONAL ERIE GARNET RB

is useful for half-wool, dyeing the animal fibre the same strength and but slightly yellower than the cotton.

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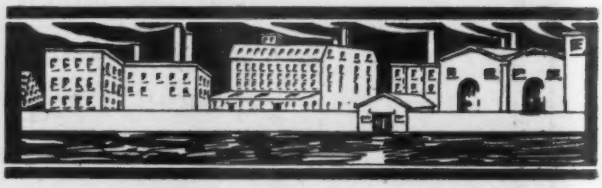

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This means a great deal to the dyer or finisher.

Sulphonated, or Soluble Oils, as they are sometimes called, cannot be made too carefully. Simply adding acid to oil, and then neutralizing, does not make a finished product. From the time the Castor Oil goes into the tanks until it is ready for storage, or to be barreled, there must be Laboratory supervision, otherwise the *next* lot is not the same as the previous one.

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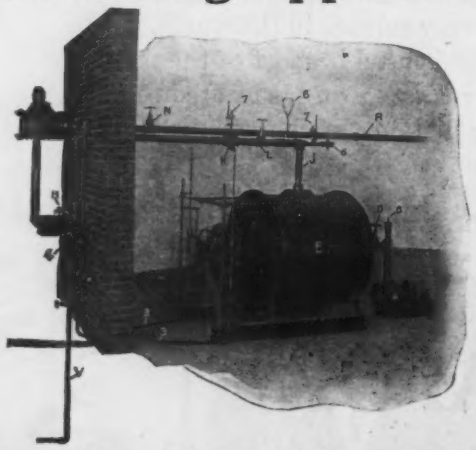

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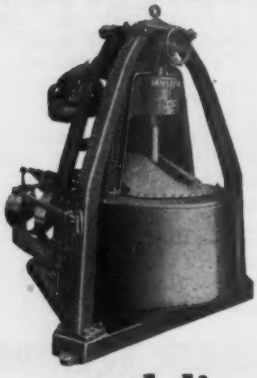

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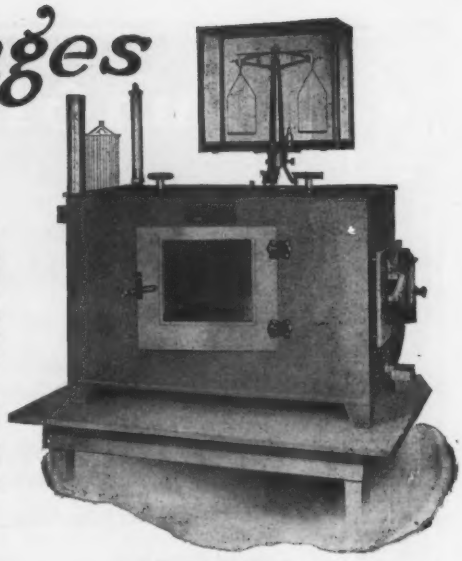

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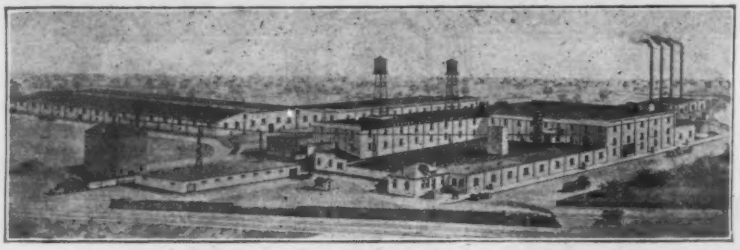

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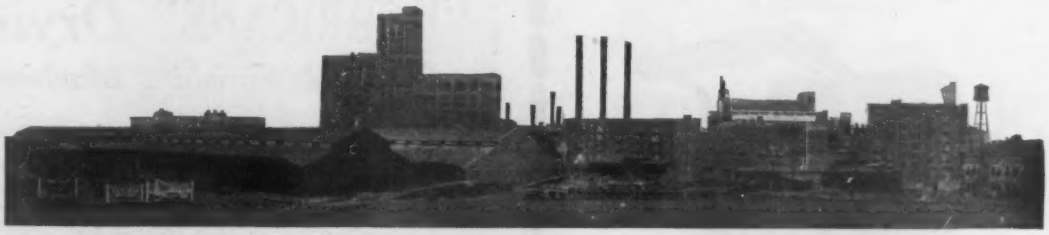

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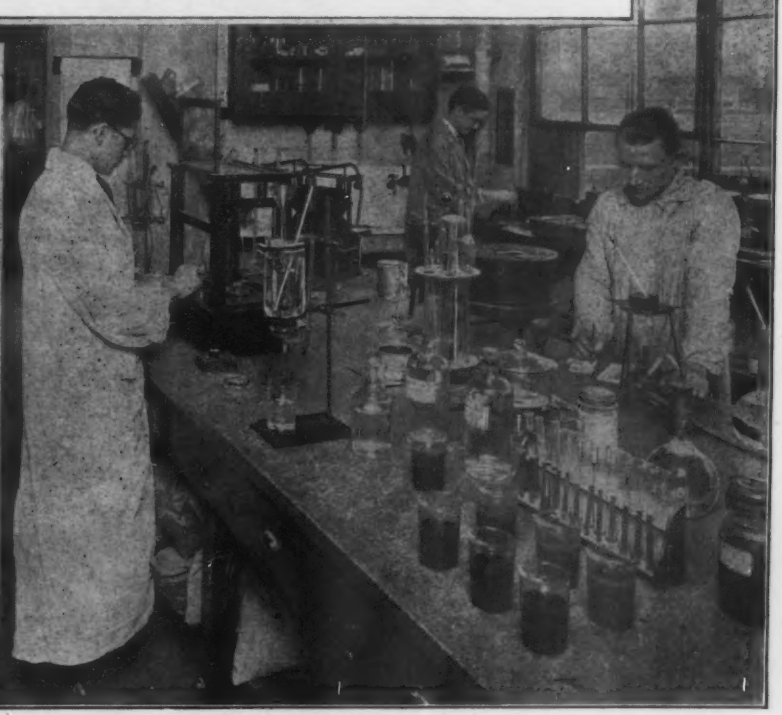

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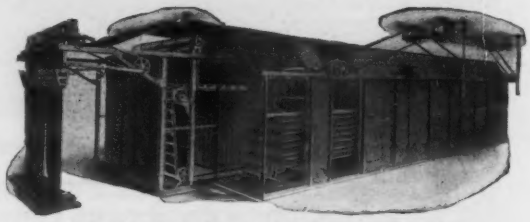

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PURE GREEN OLIVE OIL SOAP

for boiling off silk and cotton hosiery and mixed fibres. Indispensable for soaping off Indanthrenes and for general scouring purposes.

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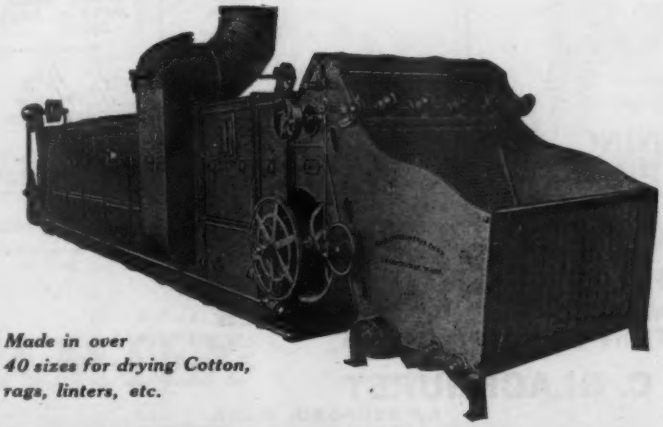

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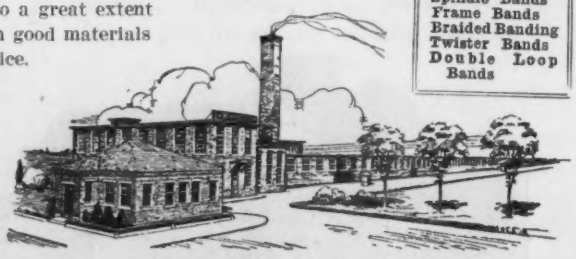

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JOHN C. BLACKHURST

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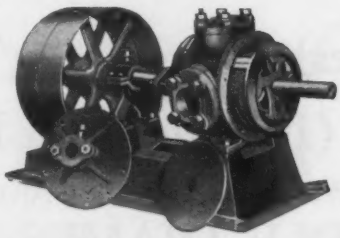
In Blackmer Size Pumps all parts that the sizing comes in contact with are made from acid resistant metal.



All parts in Blackmer Size Pumps that are subject to corrosion are quickly and easily replaceable without disturbing any of the pipe connections to the pump.

End Your Size Pump Worries
Install Blackmer Rotary Pumps

You can install a Blackmer Size Pump in your slasher room and know that it will do your work; do it continually for a long period of time without the annoyance or expense of troublesome repairs.

On the side of dependability it represents probably the highest development in its field. The design and construction of Blackmer Pumps is simplicity itself. There are only five moving parts. No valves—no leathers to cause trouble—no springs—no adjustments of any kind. Ask for any information you desire.

MORE GALLONS PER DOLLAR

Blackmer Pump Co., 1809 Century Ave., Grand Rapids, Mich.

Offices in 18 Principal Cities

Quality
in tapes is proved by Demand

AMTEX TRADE MARK REGISTERED

The great demand for AMTEX Spinning, Twisting and Spooler Tape is due to a quality that reaches beyond good materials and careful construction. The "work performed" and years of faultless service of each individual tape proves AMTEX is of superior quality.

We specialize in tapes built to order. Prices quoted upon receipt of your specifications. Satisfaction guaranteed.

Manufactured by
AMERICAN TEXTILE BANDING CO., INC.
Germantown, Philadelphia, Pa.

Sold in the South by:
CHARLOTTE SUPPLY COMPANY
Charlotte, N. C.

"AMTEX" Spinning Twisting and Spooler Tape

Fuel Savings
of 15 to 48% Shown in this Book

THIS book is not simply a catalog. It contains an abundance of evidence and testimony which shows the amazing economies obtained with Automatic Control of Temperature in offices and workrooms.

It shows how Powers Control in many of America's leading firms has reduced fuel consumption 15 to 48 per cent; and how the output of workers can be increased, and the quality of their work improved; and other profitable advantages.

For limited distribution only—

—among mill owners, agents, chief engineers and other executives interested in eliminating waste and increasing the profits of their company.

THE POWERS REGULATOR CO., 2739 Greenview Ave., Chicago.
Gentlemen:
I shall be glad to receive a copy of your book SHOP AND OFFICE TEMPERATURES.
Name .....
Position .....
Firm .....
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REEDS (All Types)

HEDDLES (Imported and Domestic)

(For Cotton, Woolen, Silk, Rayon and All Other Fabrics)

HEDDLE FRAMES

SLASHER COMBS

SAMPLES GLADLY SUBMITTED ON REQUEST

BEAMING RAITHES

Manufacturers of the Highest Quality Weaving Accessories for **over half a century**

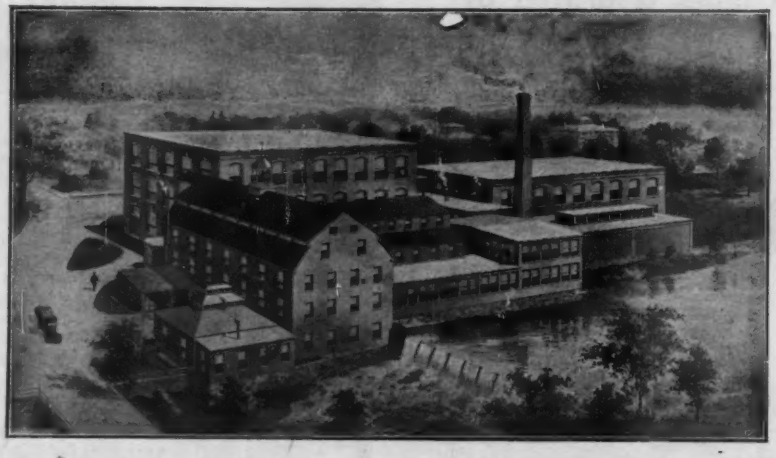
WALKER MANUFACTURING CO., Inc,

Established 1875

Southern Office:
101 AUGUSTA ST.,
GREENVILLE, S. C.

Main Office and Factory:
PHILADELPHIA

Fifty-Three Years Doing One Thing Well



Whitinsville Spinning Ring Company

Whitinsville, Mass.

Specialists since 1873.

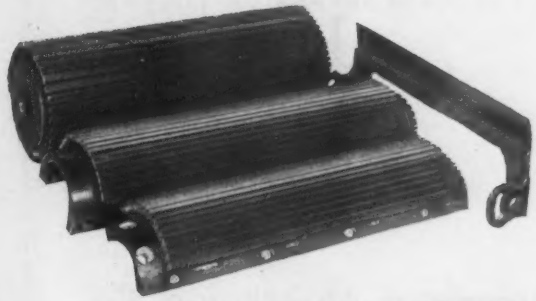
Southern Agent
W. P. DUTEMPLE, Charlotte, N. C.

A Special Setting of Half Laps That Will Not Flock

After much scientific study of half laps we have worked out a new setting that is positively guaranteed to prevent flocking; the needles themselves are made from certain alloys, which insure exceptional endurance and efficiency for the setting.

This scientific re-needling, supported by unexcelled service, is causing our list of customers to increase rapidly. Adopt the Blackstone Valley Special Setting and note the increased efficiency, regardless of make of half lap.

Write for price list and further information today.



Blackstone Valley Comb Works

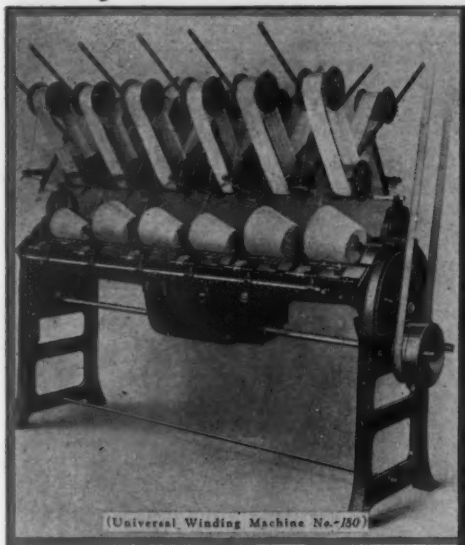
New Bedford, Mass.

Southern Representative:
L. E. WOOTEN
519 Johnston Bldg.,
Charlotte, N. C.

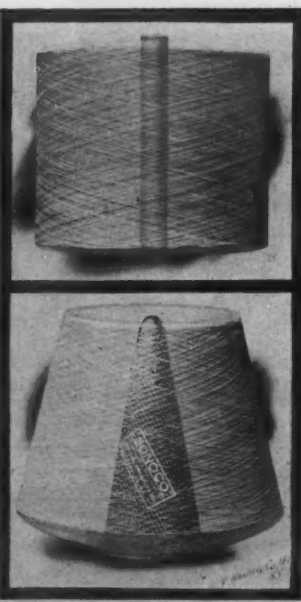
Blackstone Valley

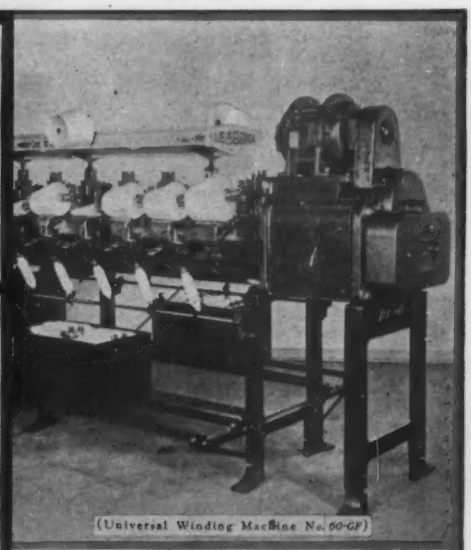
COMBER RE-NEEDLING

FOR ENGLISH—AMERICAN—FRENCH COMBS



(Universal Winding Machine No. 150)





(Universal Winding Machine No. 60-GF)

For Skein-to-Cone winding for Sweater Mills the No. 180 "Sonoco" Cones will produce ideal packages 10½ inches in maximum diameter. With other sizes of "Sonoco" Cones equally true winding is obtained and maintained.

Unexcelled packages are assured by the use of "Sonoco" Cones or "Sonoco" Tubes on high speed friction-drive winders, or winders of any other type. The X-Ray views at the left are photo-reduced from full size packages having a diameter of eight inches.

"SONOCO"

CONES, TUBES AND CLOTH-WINDING CORES FOR ALL REQUIREMENTS

SONOCO PRODUCTS CO., Mfr.,

MAIN OFFICE AND FACTORY
Hartsville, S. C.

410 OLYMPIA BLDG., NEW BEDFORD, MASS.

W. J. WESTAWAY CO., Ltd., HAMILTON, ONT.

Since 1888 reliable humidifying devices.

American Moistening Co.

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Massachusetts

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Georgia

Charlotte
North Carolina

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South Carolina

FJS STOKES FJS

WOOL CUTTER

Prepares Wool for mixing and spinning with cotton. Cuts 4 to 8 ends of roving from ball wound tops at the rate of 250 to 300 clips per minute. Length of cut adjustable up to 1½" and is absolutely uniform. Capacity 800 to 1000 lbs. per day. Only ½ H.P. motor required to operate.

Full information and quotation on request

F. J. STOKES MACHINE CO.
5832 Tabor Road Olney P.O.
PHILADELPHIA

the World's Best DETEX A type for every purpose

WATCHCLOCKS

DETEX WATCHCLOCK CORPORATION
BOSTON-23 BEACH ST. ◆ CHICAGO-4147 RAVENSWOOD AVE. ◆ NEW YORK-76 VARICK ST.

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BARBER-COLMAN COMPANY
GENERAL OFFICES AND PLANT
ROCKFORD, ILL. U.S.A.
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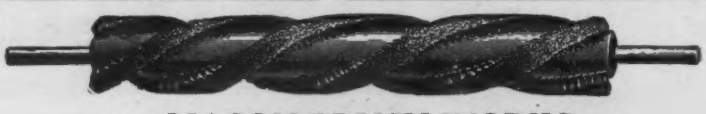
WARP TYING MACHINES
HAND KNOTTERS
WARP DRAWING MACHINES
AUTOMATIC SPOOLERS
HIGH SPEED WARPERS



MASON BRUSH WORKS
WORCESTER, MASS.

MILL and MACHINE BRUSHES
Cotton, Woolen and Silk
Made and Repaired

RUGGED CONSTRUCTION SERVICEABLE

"COLUMBUS TAPE"

GEORGIA WEBBING & TAPE CO. COLUMBUS, GA.

BRAND YOUR FABRICS

12 Har. Selvage Lettering Dobby

By Weaving Your Name or Trade Mark in the Selvages of Your Cloths

Dobbies Built with 12, 20 or 40 Harness Capacity

OUR EXPERIENCE AND ADVICE ARE AT YOUR DISPOSAL

CROMPTON & KNOWLES LOOM WORKS

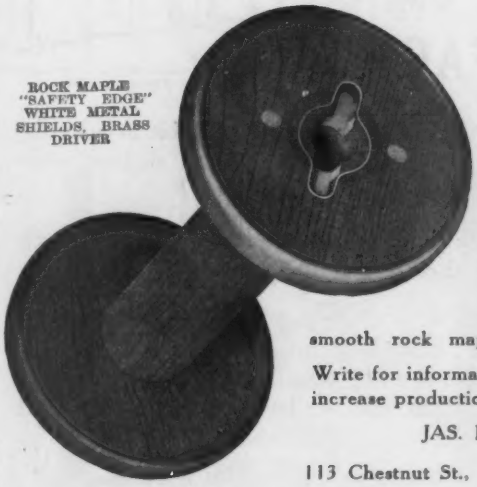
WORCESTER, MASS.

PROVIDENCE, R.I. PHILADELPHIA, PA. ALLENTOWN, PA. PATERSON, N.J.

S. B. ALEXANDER, Southern Manager
Charlotte, N. C.

Quality Spools Are an Investment

"Many years of future service" is the idea with which textile equipment is purchased in modern mills. You'll find that Billington Spools save hundreds of dollars on replacements alone, for they last longer.



ROCK MAPLE "SAFETY EDGE" WHITE METAL SHIELDS, BRASS DRIVER

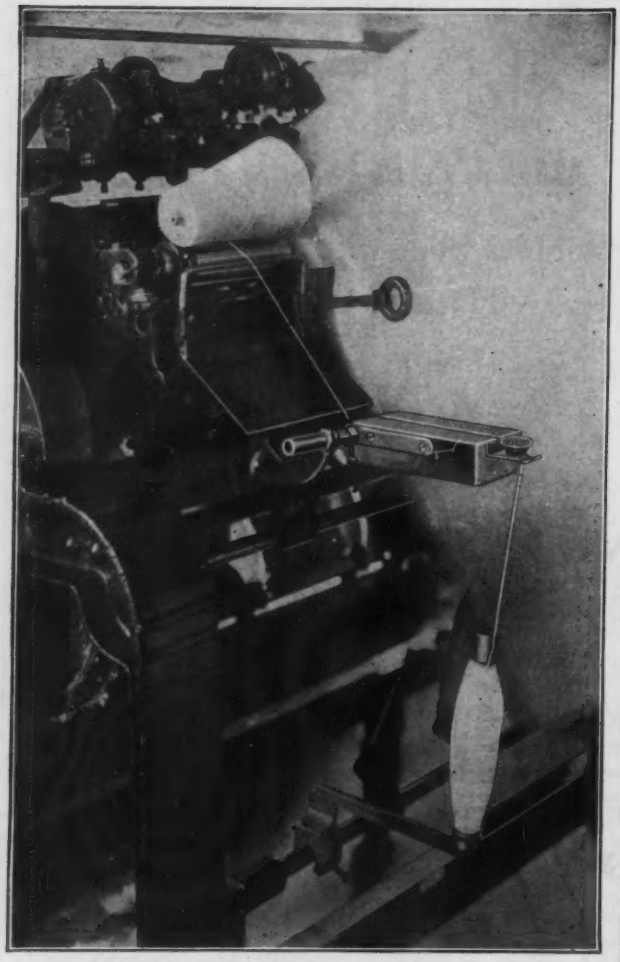
"CELUVERT" HARD FIBRE REMOVABLE HEADS, ALLOY METAL BUSHING

The progressive ideas of mills are met with in every particular by Billington Spools. The Heads cannot chip because they are made from smooth rock maple, or tough, velvety vulcanized fibre.

Write for information that tells you how to stop yarn losses, increase production and save employees' time.

JAS. H. BILLINGTON COMPANY
Est. 1848—Inc. 1899
113 Chestnut St., Philadelphia, Pa.

BILLINGTON SPOOLS



Winding Dirt?

How much dirt are you winding with your yarns?

The Eclipse Automatic Yarn Cleaner frees yarns of all dirt, slubs and other undesirable material. Its small, flexible blades adapt themselves to any size of yarn—whether cotton, wool or silk.

The yarn, itself, remains uninjured.

Simple Attachment, Easily Installed

The simplicity of the parts of the Eclipse Cleaner insures its uninterrupted service. In a few minutes it is easily applied to your winder or spooler.

An Eclipse Cleaner on trial in your mill will convince you of its ability. May we send you one; there is no obligation. What style winder or spooler do you employ?

Eclipse Textile Devices, Inc.

ELMIRA, N. Y.

Makers of

Automatic Yarn Cleaner
Automatic Stop Motion
Yarn Tension Device
Eclipse Van Ness Dyeing Machine

No wonder they're popular

Met-L-Wood Trucks are *selling*. More mill men are turning to them all the time. Personally we think it is only logical. Take the truck illustrated above for instance. What dyer or finisher *wouldn't* like it? Met-L-Wood construction—in this case monel metal on the inside, rims and corner plates plus a wood panel for lightness plus galvanized steel on the outside. Durability—try and match it. It's five or six ordinary trucks in one. Plenty of protection for goods in process—monel metal to prevent off-shades—a surface that a sheer piece of goods revels in.

We ask you—who wouldn't like it? Get the Met-L-Wood line in book form. Write today.

"MET-L-WOOD" CORP., 2421 WEST 14th ST., CHICAGO, ILL.

Trucks that are "slam-bang" proof

MET-L-WOOD "ARMORD" TRUCKS

Backing Up NOISE with FACTS

Quality Flyer Pressers

IT has lately become a habit in advertising to talk "Service" on the slightest provocation.

We wonder how many advertisers can back up their claims with facts!

S S & F CO can. Thirty years of cotton mill equipment manufacturing, holding always to a high standard of quality, allows us to claim that we have and do render real Service.

"Quality Features Built-in, Not Talked-in."

Southern Spindle & Flyer Company, Inc.

Charlotte, N. C.

Manufacturers, Overhaulers and Repairers of Cotton Mill Machinery

W. H. MONTY, Pres. and Treas.

W. H. HUTCHINS, V.-Pres. and Sec'y

WICACO

Stenton Avenue and Louden Street

Wayne Junction P. & R. R. R.

Established 1868

59 Years of Continuous Production

SCREW & MACHINE WORKS, INC.

PHILADELPHIA

RAYON

Spinning Pumps
Spindles, Bushings, Gears and all Rayon Equipment

Consult our Engineers about your problems

Reduce Your Feeler Waste

30% to 80%

WITH HOLCOMBE AUTOMATIC BUNCH BUILDERS

HOLCOMBE TEXTILE EQUIPMENT CO., INC.

Birmingham, Ala.

Before Installation Holcombe Bunch Builder 50 yds. of waste

After Installation Holcombe Bunch Builder 10 yds. of waste

A Band Will Benefit Your Business

THE welfare of employees is acknowledged as a vital factor in a successful enterprise. One of the best ways to create a better spirit in a shop or mill is by organizing a band. It is beneficial to health, improving lung power, and for building vitality of both body and brain, the mastery of a Trumpet, Trombone, Saxophone, etc. has no equal. The spirit of team work is strongly developed.

Every working man is anxious to join a band—and he takes to it as readily as any sport.

The above illustration shows the shop band of the Republic Iron and Steel Co. at Youngstown. The success of the band has been due in a great measure to the outfit of King Instruments that they use.

Let us help you organize a band among your employees—we can furnish complete information about starting the band, what instruments to buy, etc. Use the coupon below to get this data.

THE H. N. WHITE CO., Cleveland, O.

Manufacturers of KING *Band Instruments*

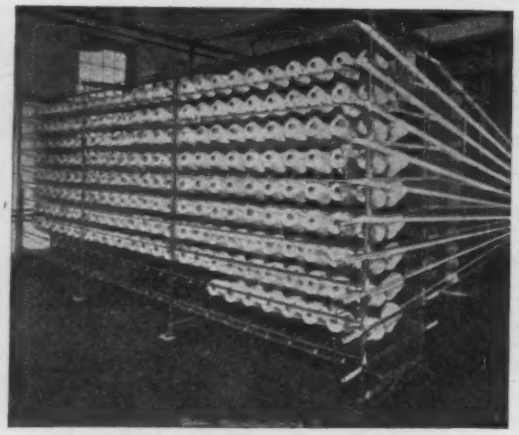
The H. N. White Co., 5224-81 Superior Ave., Cleveland, O.
Send us information about organizing a band.

Company_____

Your Name_____

Address_____

City_____ State_____



GLOBE HIGH SPEED
steel
OVER END CREEL

The tube does not revolve, which feature increases production and decreases knots.

Easy to creel.

Another feature is a simple but effective tension device.

Electric stop motion optional.

Repeat orders prove its success.

ASK TODAY FOR FULL DETAILS

GLOBE MFG. CO., 2009-13 Kinsey St., PHILA., PA.
Established 50 years

For a half century builders of full line of The Denn Warpers and Beamers

B.S.Roy & Son Co.
Established 1868
Worcester, Mass.

America leads the world in the manufacture of textile machinery.

American brains and ingenuity have developed machinery in all the textile branches to the point of superiority now generally recognized.

Ways and means for high quantity production and therefore lowered cost and price have been perfected.

B. S. Roy & Son Company, established in 1868, is proud of its contribution of machinery to the textile industry of nearly sixty years. Since the early inventions of its founders it has been the constant aim of this organization to improve and perfect grinding machinery and to lower its cost of making without sacrificing the highest quality.

E. M. TERRYBERRY, Southern Agent
Commercial Bank Bldg., Charlotte, N. C.

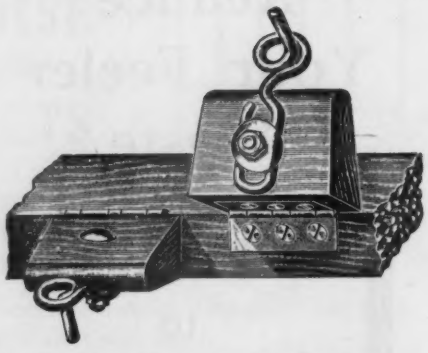
AMERICAN
SUPPLY COMPANY
PROVIDENCE, R. I.

Manufacturers of

LOOM HARNESS,
WEAVING REEDS,
OAK TANNED LEATHER
BELTING, STRAPPING,
ETC.

We make a specialty of Harness for Warp Drawing Machines

The Palmer Adjustable Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and performance of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and Manufactured by

THE I. E. PALMER COMPANY
Middletown, - - - Connecticut

More Delivered when Called For

EMPLOYERS note a healthy increase in productiveness of the worker.—*Statistical note.*

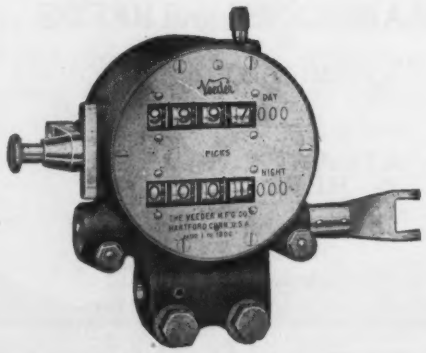
One of the reasons they note it, is because they *count* it.

And one of the reasons they *get* it, is because they COUNT it!

When every minute of your worker's time must count in recorded production, you're pretty sure of a pretty high *count* on your

Veeder COUNTERS

Below is shown the Duplex Loom Pick Counter, which embodies *two* regular Veeder Pick Counter mechanisms in a single case, for two-shift operations.



The double dial indicates separately the output of day and night operators. When running two-shifts, you need take readings but *once a week*—same as when using a single counter on the one-shift plan. Saves clerical work and confusion. Write for textile counter *booklet* showing the "Duplex" and many other specialized textile counters.

The Veeder Mfg. Co.

6 Sargeant Street, Hartford, Conn.

Southern Representatives:

Carolina Specialty Co., Charlotte, N. C.

E. E. Lovern Newnan, Ga.

The Band Promotes Wholesome Spirit

An important factor of recreation and enjoyment, the industrial band is also the means of building up and maintaining a wholesome community spirit.

With Conn's new plans and the help and cooperation which Conn is able to give, a band or orchestra can be organized wherever there is one interested person.

A complete set of Conn instruments, recognized by professionals as the world's finest, can now be had with no down payment—just a small monthly payment per instrument. Or if you prefer to rent, we can supply good instruments, applying the rent on the purchase price, should you decide to buy them.

Conn's Band Service Department of Experts will help in every detail of organizing. Our half-century experience is at your disposal, without cost or obligation.

Send the coupon now for complete information. Let us tell you how you can have a band or orchestra. Remember, no obligation is incurred by inquiring.

CONN BAND INSTRUMENTS

WORLD'S LARGEST MANUFACTURERS

C. G. CONN, Ltd., 1115 Conn Bldg., Elkhart, Ind.
Please send complete details of your new purchase plans on complete sets ( ); information on free trial offer on any instrument.

(Mention Instrument Here)

Name .....

St. or R.F.D. .....

City .....

State .....

Washburn Wood Top Rolls

FOR LONG DRAFT SPINNING

Before making large expenditures for any Long Draft System, manufacturers are advised to investigate the merits of the Washburn Wood Top Roll whether it is desired to eliminate intermediate processes or produce fine counts in mills equipped only for course yarns.

With this device, long draft spinning is common practice in many mills and it is practical, for instance, to spin—

Count	Single	Double	Draft	Cotton
20-s	1.25	2.50	16	1″
30-s	1.50	3.00	20	1 1/16″
40-s	2.50	4.00	20	1 1/8″
50-s		5.00	20	1 1/8″
60-s		6.00	20	1 1/8″-1 1/4″
70-s		7.00	20	1 1/4″
80-s		8.00	20	1 5/8″
100-s		10.00	20	1 1/2″-1 5/8″

All cotton of good character and body.

WASHBURN
IF IT'S ROLLS, WE MAKE THEM

224-234 No. Water St. New Bedford, Mass.

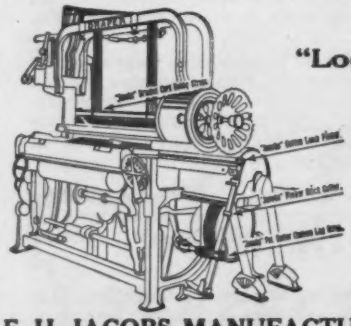
Robert Hall & Sons, Bury, Ltd., BURY, ENGLAND

Makers of all classes of Looms, Preparing and Finishing Machinery for Cotton, Woolen, Linen, Jute, Asbestos, Silk, Ramie, etc.

Complete plants of Weaving Machinery for Woven Driving Belts, Hosepipes, Sailcloth and Duck, Motor Tyres, Asbestos Brake Linings, Turkish Towels, Sponge Cloths, Calico, Fustian, Velvets, Plushes, Carpets of all sorts, Horsehair, Hair Cloth, Needlework and Embroidery Canvas, Smallwares, etc.

Complete lists of machinery made supplied on application.

Double Plush and Velvet Looms on most modern Principle.



Our "Loom Supplies"

are used by Draper Corporation, Crompton & Knowles, Mason Machine Works, Stafford Company, Hopedale Mfg. Co. and carried in stock by all the largest Supply Houses.

E. H. JACOBS MANUFACTURING COMPANY
DANIELSON, CONNECTICUT
Southern Factory Branch, Charlotte, N. C.

"ATLANTA" HARNESSES and REEDS

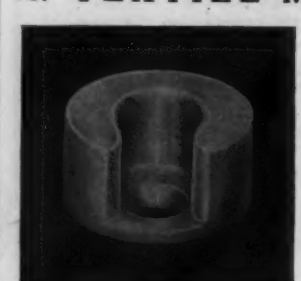
"Quality and Service That Satisfies"

ATLANTA HARNESS & REED MFG. CO.
ATLANTA, GA.
P. O. Box 1375
Telephone Main 0517

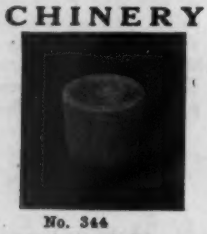
RODNEY HUNT ROLLS WOOD METAL RUBBER
FOR ANY MACHINE
47 Maple Street
ORANGE, MASS. U.S.A.

White Seal Rolls
For Bleachery Washers, etc.

THE SUPERIOR PORCELAIN for TEXTILE MACHINERY



No. 654



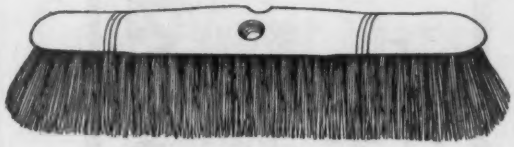
No. 344
manufactured by
PAGE-MADDEN CO.
Incorporated
128-34 Sumpter St.
Brooklyn, N. Y.

Samples and Prices on Request

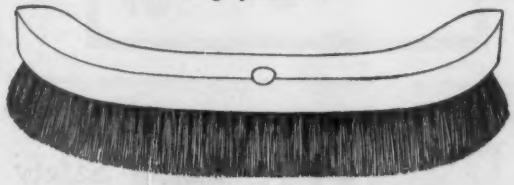
PERKINS Practical Brush

What's Your Cleaning Mileage?

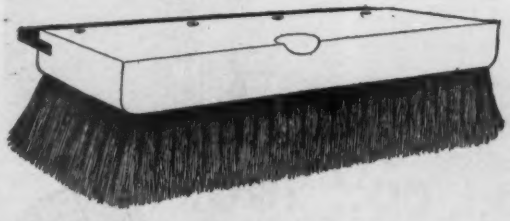
Have you ever stopped to figure how much cleaning mileage you were getting from your floor sweeps and scrubbing brushes?



Cleaning brushes may look alike—but there is a heap of difference in their wearing qualities.



The three types of cleaning brushes you see here were developed by our designers expressly for cotton mills. Their appearance has been duplicated—but their wearing qualities have never been equaled.

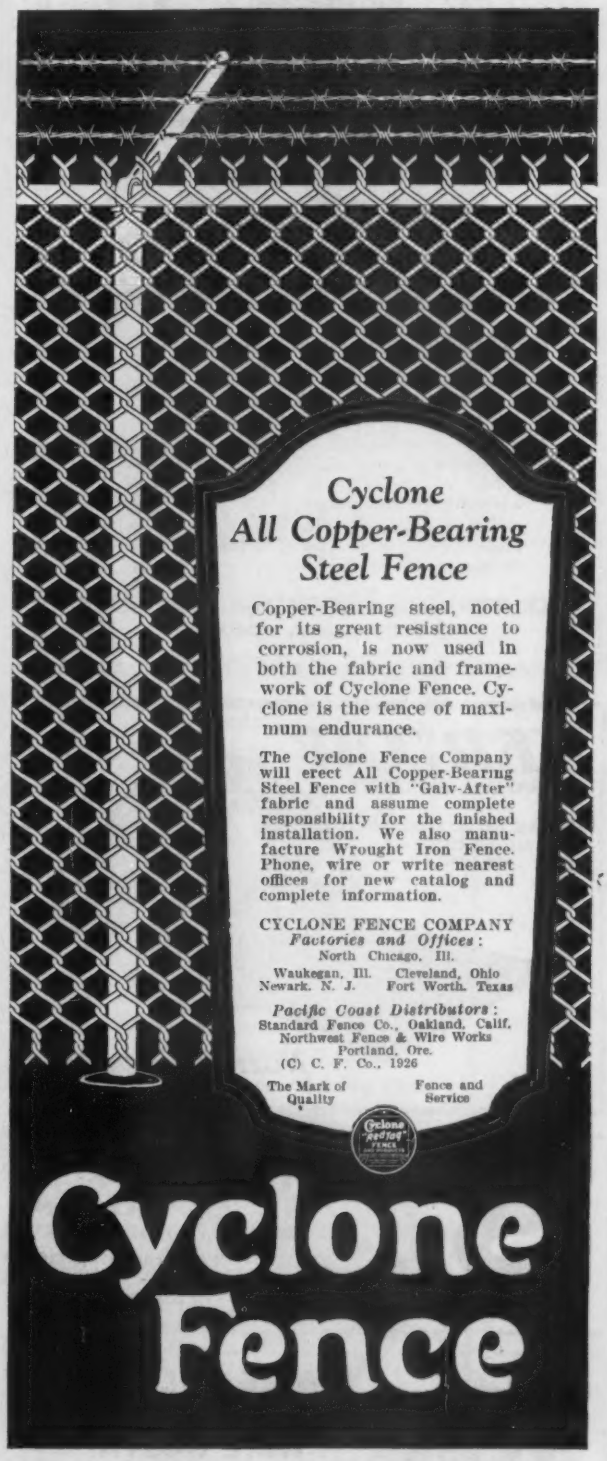


Make sure you are getting the greatest possible cleaning mileage. By all means specify Perkins Brushes.

ATLANTA BRUSH CO.
ATLANTA, GA.

Guaranteed Textile Brushes

Another Great Achievement in Fence Manufacture


Cyclone
All Copper-Bearing
Steel Fence
Copper-Bearing steel, noted for its great resistance to corrosion, is now used in both the fabric and framework of Cyclone Fence. Cyclone is the fence of maximum endurance.
The Cyclone Fence Company will erect All Copper-Bearing Steel Fence with "Galv-After" fabric and assume complete responsibility for the finished installation. We also manufacture Wrought Iron Fence. Phone, wire or write nearest offices for new catalog and complete information.
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Waukegan, Ill. Cleveland, Ohio
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Fence and Service
Cyclone Galv-After FENCE
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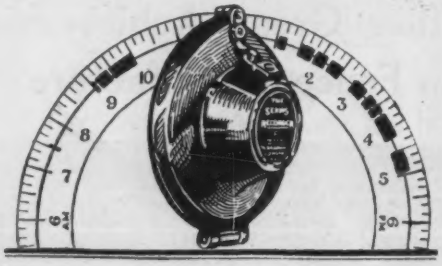
CYCLONE COPPER-BEARING STEEL ENDURES



Which Would You Rather Do—

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or

Increase Production!

THERE'S no doubt about the answer. Ninety-nine executives out of a hundred would rather leave wages alone, and make their saving by increased production. It not only avoids resentment, but it's also the way to save the BIGGEST MONEY.

Suppose you could increase the general productive time of all your machinery *merely five minutes a day!* What would it mean in thousands of dollars a year saved to your company?

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OPEN STEEL
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IRVING
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Safety Under Foot

The standardized product of the world's largest steel flooring factory, backed by the resources and responsibility which come with 24 years of experience. Write for Bulletin H-100.

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DEEP WELL DRILLING—WATER SUPPLY ENGINEERS
Twenty-five Years Experience in Solving Water Problems
LUITWIELER NON-PULSATING DEEP WELL PUMPS
The Most Efficient Water Supply Equipment Made.

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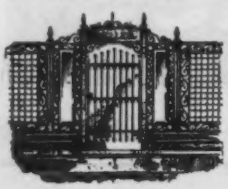

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Send for FREE catalog giving counts and prices on thousands of classified names of your best prospective customers—National, State and Local—Individuals, Professions, Business Concerns.
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keep them away from your plant

COMPEL tramps and hangers-around to consider the safety of your buildings and inflammable yard materials. Put up a high, unclimbable Anchor Chain Link Fence.

Anchor Fences provide unfailing protection. They reduce fire risk, prevent theft, and permit more effective control of personnel.

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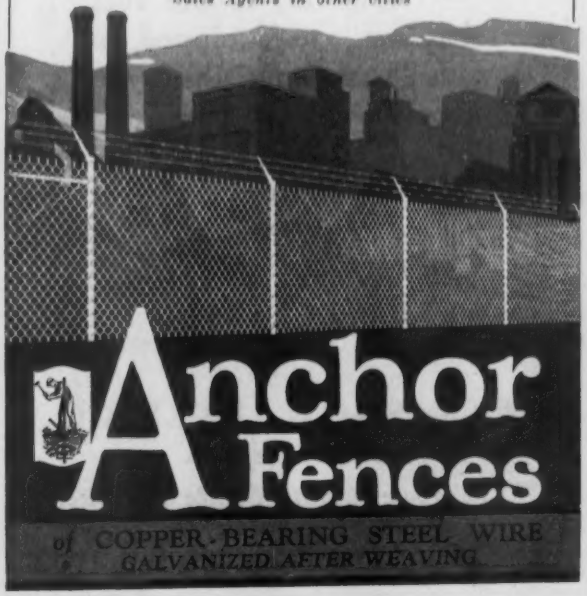

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of COPPER-BEARING STEEL WIRE
GALVANIZED AFTER WEAVING

Factory Flooring

Laid directly over worn concrete

BLOXONEND

BLOXONEND is the choice of hundreds of leading industrial concerns because it is the only factory FLOORING that combines DURABILITY and RESILIENCY with LASTING SMOOTHNESS.

The use of Bloxonend eliminates floor repairs and insures a safe, comfortable working surface. Its lasting smoothness minimizes wear and tear on trucks and means faster and safer trucking.

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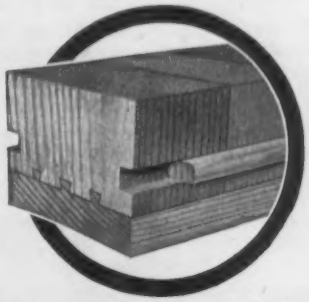
KANSAS CITY, MO.
Branch Offices in Leading Cities



Comes to the job with tough blocks of Southern Pine dovetailed endwise onto 8 ft. baseboards. Stays smooth.

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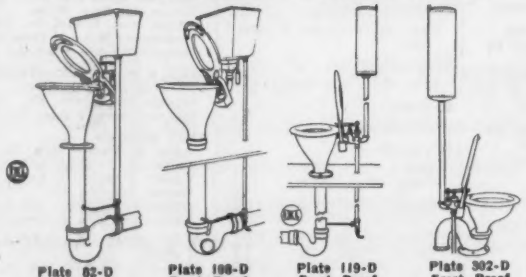

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Plate 300-D Pressure Closet

WRITE FOR DESCRIPTIVE CATALOG

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Plate 840-D Pressure Reducing Regulator

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Less than carload shipments of our own brand of IFCO Maple and Oak Flooring from Charlotte Warehouse —carlot shipments direct from our mills in Michigan and Ohio.

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Hardwood Flooring

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Grayling, Mich.

Chief Brand
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CHLORINE GAS.
Electro Bleaching Gas Co.
Mathieson Alkali Works, Inc

CLEANING AND AERATING MACHINE FOR COTTON.
Murray Company, The.

CLEANING COMPOUND (FLOOR.)
Denison Mfg. Co.

CLEARER CLOTH.
(See Cloth).

CLOCKS—HANK, ETC.
(See Counters.)

CLOCKS—WATCHMAN.
Detex Watchclock Corp.

CLOSETS—WATER.
(See Toilets.)

CLOTH CUTTERS.
Firsching, J. A.
Wildman Mfg. Co.

CLOTH ROOM MACHINERY AND SUPPLIES.
Butterworth & Sons Co., H. W.
Firsching, J. A.
Hopedale Mfg. Co.
Saco-Lowell Shops.
Textile Finishing Mchry. Co.
Wildman Mfg. Co.

CLOTH SHRINKING MACHINERY.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Tolhurst Mch. Wks.

CLOTH WINDERS.
(See Winders.)

CLUTCHES—FRICTION.
Allis-Chalmers Mfg. Co.
Carlyle-Johnson Machine Co.
Link-Belt Company.
Morse Chain Co.

CLUTCH LININGS.
Carlyle-Johnson Mch. Co.

COAL AND ASH HANDLING MACHINERY.
Link-Belt Company.
Morse Chain Co.

COAL TAR DISINFECTANTS.
(See Disinfectants.)

COCKS.
(See Valves.)

COMB APRONS.
(See Aprons.)

COMBS—SLASHER.
(See Slasher Equipment.)

COMBER AND COMBER SUPPLIES.
Blackstone Valley Comb Works.
Halton's Sons, Thomas
U S Bobbin & Shuttle Co.
Whitin Machine Wks.

COMMISSION MERCHANTS & DEALERS.
(See Cotton Cloth Commission Merchants.)

COMPENSATORS (MOTOR STARTING.)
Fairbanks-Morse & Co.

COMPRESSORS—AIR, GAS, ETC.
Allis-Chalmers Mfg. Co.
American Well Works.
General Electric Co.

COMMUTATOR BRUSHES.
(See Brushes—Motor & Generator.)

COMPUTING SCALES.
(See Scales.)

CONCRETE REINFORCEMENT
Birmingham Slag Co.
Ryerson & Son, Inc., Jos. T.

CONCRETE REINFORCING STEEL.
Ryerson & Son, Inc., Jos. T.

CONDENSERS.
Allis-Chalmers Mfg Co.
Westinghouse Elec. & Mfg. Co.

CONDITIONING OVENS AND MACHINERY.
Emerson Apparatus Co.

CONDUITS.
(See Elec. Machinery & Supplies.)

CONES (KNITTING YARN).
Sonoco Products Co.

CONE WINDING MACHINE.
(See Winding Machinery.)

CONNECTORS—FRANKEL SOLDERLESS.
Westinghouse Elec. & Mfg. Co.

CONSULTANT (BUSINESS METHODS).
Ernst & Ernst.
Loper & Co., Ralph E.

CONSULTING ENGINEERS.
(See Architects and Engineers)

CONTRACTORS AND ENGINEERS—BUILDING.
Austin Co.
Robert & Co.
Sirrine & Co., J. E.
Truscon Steel Co.

CONTRACTORS AND ENGINEERS (STEAM.)
Mitchell & Co., W. K.

CONTRACTORS—ELECTRICAL.
(See Electrical Engineers.)

CONTROLLING INSTRUMENTS—TEMPERATURE.
General Electric Co.
Johnson Service Co.
Powers Regulator Co.
Taylor Instrument Co.

CONTROLLERS—ELECTRIC.
Cutler Hammer Mfg. Co.
Fairbanks-Morse & Co.

CONVEYORS—BELT.
(See Belt Conveyors.)

CONVEYING MACHINERY.
American Supply Co.
Link-Belt Co.
Mathews Conveyor Co.
Morse Chain Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.

CONVEYORS—PORTABLE.
Link-Belt Co.
Mathews Conveyor Co.
Morse Chain Co.

CONVEYORS (ROLLER).
Mathews Conveyor Co.

COOLERS.
(See Humidifying Apparatus.)

COOLERS—WATER.
(See Water Coolers).

COOLING AND CONDITIONING EQUIPMENT.
American Moistening Co.
Carrier Engineering Corp.
Johnson Service Co.
Parks-Cramer Co.

COOLING TOWERS.
(See Tanks and Towers).

COPPER STAMPS AND STENCILS.
(See Stamps, Stencils, etc.

CORDAGE MACHINERY.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

CORKBOARD.
Armstrong Cork & Insulation Co.

CORK COVERED ROLLS.
Armstrong Cork & Insulation Co.

COPPING MACHINERY. (SILK).
Eastwood, Benjamin.

CORPORATION FINANCE (TEXTILE).
Textile Banking Co.

CORRUGATED SHEET STEEL.
Irving Iron Works.
Ludlum Steel Co.
Ryerson & Co., Inc., Jos. T.

COST SYSTEMS.
Ernst & Ernst.
Loper & Co., Ralph E.

COTTON CLEANING AND AERATING MACHINE.
Murray Company, The.

COTTON FANS.
(See Blowers.)

COTTON YARN AND CLOTH COMMISSION MERCHANTS AND DEALERS.
Aberfoyle Mfg. Co.
Callaway Mills.
Fawcett, Hughes.
Grisman Co.
Hesslein & Co., Inc.
Hunter Mfg. & Commission Co.
Jamieson, J. E.
Lane & Co., J. H.
Quissett Mill.
Weimar Bros.
Woodward, Baldwin & Co.

COTTON MERCHANTS AND BROKERS.
Beer & Co., H. & B.
Newburger Cotton Co.

COTTON MACHINERY AND SUPPLIES.
Acme Staple Co.
Atlanta Harness & Reed Mfg. Co.
American Machine Co.
Atwood Machine Co.
Barber-Colman Co.
Barber Mfg. Co.
Billington Co., Jas. H.
Blackhurst, John C.
Blackstone Valley Comb Works.
Butterworth & Sons, H. W.
Crompton & Knowles Loom Works.
Davenport Mfg. Co.
Draper Corporation.
Easton & Burnham Mch Co.
Eclipse Textile Devices, Inc.
Emerson Apparatus Co.
Fales & Jenks Mch. Co.
Fletcher Works.
Foster Machine Co.
Hall & Sons, Robert, Bury, Ltd.
Halton's Sons, Thomas
Holcombe Textile Equipt. Co.
Hopedale Mfg. Co.
Howard Bros Mfg. Co.
Howard & Bullough
Hunt Machine Co., Rodney.
Jacobs Mfg. Co., E. H.
Lambeth Rope Corp.
Lestershire Spool Mfg. Co.
Litchfield Shuttle Co.
Mason Brush Works.
Met-L-Wood Corp.
Mill Devices Co.
Mossberg Corp., Frank.
Myers, L. H.
Page-Madden Co., Inc.
Palmer Co., I. E.
Parker Co., Walter L.
Phila. Drying Mchry. Co.
Proctor & Schwartz, Inc.
Root Co.
Roy & Son, B. S.
Sargents' Sons Corp., C. G.
Saco-Lowell Shops.
Schaum & Uhlinger.
Sipp Machine Co.
Stafford Co.
Southern Spindle & Flyer Co.
Steel Heddle Mfg. Co.
Stokes Machine Co., F. J.
Textile Finishing Machinery Co.
Tolhurst Mch. Wks.
U S Bobbin & Shuttle Co.
Veeder Mfg. Co.
Walker Mfg. Co.
Warp Compressing Machine Co.
Whitin Machine Works.
Whitinsville Spinning Ring Co.
Wicaco Screw & Mch. Wks.
Wickwire-Spencer Steel Co.
Wilcox & Gibbs Sewing Mch. Co.
Wilson Bros. Bobbin Co., Ltd.
Woonsocket Mch. & Press Co.

COTTON TAPE LOOM.
Fletcher Works.
Schaum & Uhlinger.

COTTON YARN MILLS.
(See Yarn—Cotton).

COUNTERS—REVOLUTION, HANK, PICK, ETC.
Ohmer Fare Register Co.
Root Co.
Veeder Mfg. Co.

COUPLING—SHAFT.
Dodge Mfg. Co.

COVERING—ROLLER.
(See Roller Covering).

CRABBING MACHINES.
Hunt Machine Co., Rodney.

CRANES—ELECTRIC TRAVELING.
Chisholm-Moore Mfg. Co.
Link Belt Co.
Ryerson & Son, Inc., Jos. T.
Wright Mfg. Co.

CRANES—HAND POWER
Chisholm-Moore Mfg. Co.
Fairbanks-Morse & Co.
Link Belt Co.
Ryerson & Son, Inc., Jos. T.
Wright Mfg. Co.

CRAYONS.
Lowell Crayon Co.

CREOSOTED FLOORING. BLOCKS, POSTS, SHINGLES, ETC.
Southern Wood Preserving Co.

CULVERT AND PIPE.
Carolina Metal Culvert Co.

CUTTERS—CLOTH.
(See Cloth Cutters.)

CUTTERS—THREAD.
(See Thread Cutters.)

DELIVERY CASES.
(See Boxes—Packing.)

DEXTRINES.
(See Dyestuffs and Chemicals)

DIAL SCALES.
(See Scales.)

DIES—STEEL.
(See Stamps, Stencils, Etc.)

DIE STOCKS.
(See Pipe Threaders.)

DIESEL ENGINES.
See Engines—Diesel.)

DISINFECTANTS.
Laurel Soap Mfg. Co., Inc.

DOBBY CHAINS.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

BOBBY CARDS:
Jacobs & Co., E. H.

DOFFING BOXES—MILL.
(See Boxes—Mill.)

DOFFER FILLETS.
(See Fillets.)

DOFFING CARS.
(See Trucks).

DRAINACE CULVERT.
(See Culvert)

DRAWING FRAMES
Howard & Bullough.
Saco-Lowell Shops
Whitin Machine Works.
Woonsocket Mch. & Press Co.

DRESSING MACHINERY.
Davis & Furber Mch. Co.

DRILLS—ELECTRIC.
Carter Electric Co.
Independent Pneumatic Mchry. Co.
Ryerson & Son, Inc., Jos. T.
Westinghouse Electric & Mfg. Co.

DRINKING FOUNTAINS.
(See Fountains—Drinking)

DROP WIRES.
Draper Corp.
Steel Heddle Mfg. Co.

DRYING APPARATUS.
American Moistening Co.
Carrier Engineering Corp.
Emerson Apparatus Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz., Inc.
Sargent's Sons Corp., C. G.

DRYING MACHINERY AND EQUIPMENT.
American Laundry Mchry. Co.
American Moistening Co.
Butterworth, H. W., & Sons Co.
Globe Mfg. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz Inc.
Sargent's Sons Corp., C. G
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DUST COLLECTORS.
(See Blowers and Blowing Systems).

DUSTING MACHINERY.
Proctor & Schwartz, Inc.

DYERS, BLEACHERS AND FINISHERS.
Aberfoyle Mfg. Co.
American Yarn & Processing Co.
Bancroft & Son Co., Jos.
Dixie Mercerizing Co.
Franklin Process Co.
Industrial Fibre Co.
Southern Mercerizing Co.
Standard Coosa Thatcher Co.

DYEING, BLEACHING, SCOURING AND FINISHING MACHINERY AND EQUIPMENT.
American Laundry Mchry Co.
Blackmer Pump Co.
Branwood & Son, John
Butterworth & Sons Co., H. W.
Electro Bleaching Gas Co.
Emerson Apparatus Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Globe Mfg. Co.
Hall & Sons, Robert, Bury, Ltd.
Hungerford & Terry, Inc.
Hunt Machine Co., Rodney.
Johnson, Chas. B.
Kemp Mfg. Co., C. M.
Oakite Products, Inc.
Page-Madden Co., Inc.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Schaum & Uhlinger.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DYEING MACHINES (PACKAGE AND SPOOL.)
Franklin Process Co.

DYE STICKS.
Phila. Drying Machinery Co.

DYE VATS AND TUBS.
(See Tanks or Bleaching Kiers.)

DYESTUFFS AND CHEMICALS.
American Diamalt Co.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Berne, Scrymser Co.
Bosson & Lane.
DuPont de Nemours & Co., E. I.
Ciba Co., Inc.
Electro Bleaching Gas Co.
Fleischmann Co., The.
Ford Co., J. B.
Grasselli Chemical Co.
General Dyestuff Corp.
Kali Mfg. Co.
Laurel Soap Mfg. Co.
Mathieson Alkali Wks. Inc.
National Aniline & Chemical Co.
Newport Chemical Wks.
Oakite Products, Inc.
Roessler & Hasslacher Chemical Co.
Penick & Ford Sales Co., Inc.
Rohm & Haas.
Seydel-Wooley Co.
Staley Mfg. Co.
Surpass Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.

ELECTRIC CONDUIT AND FITTINGS.
(See Electrical Machinery and Supplies.)

ELECTRIC DYNAMOS AND MOTORS.
(See Motors and Generators.)

ELECTRIC FANS.
(See Fans—Electric.)

ELECTRIC LAMPS.
(See Lamps.)

ELECTRIC LAMP GUARDS
Carter Electric Co.

ELECTRIC LIGHTING ENGINEERS.
(See Illuminating Engineers)

ELECTRICAL ENGINEERS AND CONTRACTORS.
Michael & Bivens, Inc.

ELECTRICAL MACHINERY, INSTRUMENTS AND SUPPLIES.
Allis-Chalmers Mfg. Co.
Benjamin Electric Mfg. Co.
Carter Electric Co.
Century Electric Co.
Cooper Hewitt Electric Co.
Cutler-Hammer Mfg. Co.
Fairbanks-Morse & Co., Inc.
General Electric Co.
Independent Pneumatic Mchry. Co.
Lincoln Electric Co.
Westinghouse Elec. & Mfg. Co.

ELECTRIC MOTORS
(See Motors.)

ELECTRIC POWER.
(See Power.)

ELECTRIC STARTERS.
Cutler-Hammer Mfg. Co.

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BUYERS' INDEX—Continued.

ELECTRIC TRACTORS AND TRUCKS.
(See Tractors and Trucks—Electric.)

ELEVATORS.
Link-Belt Company.
Morse Chain Co.
Mathews Conveyor Co.

ELEVATORS—PORTABLE.
Mathews Conveyor Co.
Wright Mfg. Co.

ENAMEL GUIDES.
Page-Madden Co., Inc.

ENAMEL MILL WHITE.
(See Paint.)

ENGINES (DIESEL.)
Fairbanks-Morse & Co.

ENGINES (HOISTING).
Fairbanks-Morse & Co.

ENGINES—OIL, GAS, KEROSENE AND GASOLINE.
Allis-Chalmers Mfg. Co.
Fairbanks-Morse & Co., Inc.

ENGINES (STEAM).
Allis-Chalmers Mfg. Co.
Lombard Iron Works & Supply Co.
Toomey, Frank.
Westinghouse Elec. & Mfg. Co.

ENGINE ROOM APPLIANCES AND SUPPLIES.
Irving Iron Works.
Jenkins Bros.
Lunkenheimer Co.
Taylor Instrument Co.
Westinghouse Elec. & Mfg. Co.

ENGINEERS—CONSULTING. AND EFFICIENCY.
Ernst & Ernst.
Loper & Co., Ralph E.

ENGINEERS—MILL.
(See Architects.)

EXHAUSTERS.
(See Blowers.)

EXPORTERS—COTTON.
(See Brokers.)

EXTRACTORS—HYDRO.
American Laundry Mchry. Co.
Fletcher Works.
Philadelphia Drying Mchy. Co.
Schaum & Uhlinger.
Tolhurst Machine Works.

FACTORY AND INDUSTRIAL SITES.
(See Industrial Sites.)

FACTORY MANAGEMENT SYSTEMS.
Ernst & Ernst.
Loper & Co., Ralph.

FANS—ELECTRIC.
Benjamin Electric Mfg. Co.
Carrier Engineering Corp.
Carter Electric Co.
Century Electric Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

FANS—CONVEYING, POWER AND EXHAUST
(See Blowers and Blowing Systems.)

FASTENERS—BELT.
(See Belt Fasteners.)

FARE BOXES & REGISTER.
Ohmer Fare Register Co.

FEED WATER PURIFIERS.
(See Boiler Feed Water Purification.)

FEEDERS.
(See Automatic Feeders).

FELTING MACHINERY.
Proctor & Schwartz, Inc.

FENCE—STEEL AND IRON
Anchor Post Iron Wks.
Cyclone Fence Co.

FENCE POSTS—CREOSOTED PINE.
Southern Wood Preserving Co.

FENCE POSTS (STEEL AND IRON.)
Anchor Post Iron Wks.
Cyclone Fence Co.

FILLETS (CYLINDER DOFFER, BURNISHERS AND STRIPPER.)
Howard Bros. Mfg. Co.

FILLING—CAP AND WARP.
U S Bobbin & Shuttle Co.

FILTERS (WATER.)
Hungerford & Terry, Inc.

FINISHING.
(See Dyers, Bleachers and Finishers.)

FINISHING MACHINERY.
(See Dyeing, Bleaching and Finishing Machinery.)

FINISHING, BLEACHING AND SIZING MATERIALS.)
American Diamalt Co.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Corn Products Refining Co.
DuPont de Nemours & Co., E. I.
Drake Corp.
Electric Bleaching Gas Co.
Fleischman Co., The.
Ford Co., J. B.
Grasselli Chemical Co.
General Dyestuff Corp.
Houghton & Co., E. F.
Kali Mfg. Co.
Keever Starch Co.
Laurel Soap Mfg. Co., Inc.
Mathieson Alkali Works, Inc.
National Aniline & Chemical Co.
Neutrasol Products Co.
Newport Chemical Works.
Oakite Products, Inc.
Penick & Ford Sales Co., Inc.
Philadelphia Silk Oil Co.
Roessler & Hasslacher Chemical Co.
Rohm & Haas Co.
Seydel-Woolley Co.
Staley Mfg. Co., A. E.
Stein, Hall & Co., Inc.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

FIRE DOORS AND HARDWARE.
Truscon Steel Co.

FIRE HOSE.
(See Hose—Fire.)

FIRE PROTECTING PAINT.
(See Paint.)

FLAT STEEL HEDDLES.
Steel Heddle Mfg. Co.

FLAX SPINNING.
U S Bobbin & Shuttle Co.

FLEXIBLE COUPLINGS.
Allis-Chalmers Mfg. Co.

FLOOD LIGHTS—ELECTRIC.
Cooper Hewitt Electric Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

FLOORING LUMBER.
Carter Bloxoned Flooring Co.
Indiana Flooring Co.
Kerry & Hanson Flooring Co.
Southern Pine Association
Southern Wood Preserving Co.

FLOORING—WOOD BLOCKS.
Carter Bloxoned Flooring Co.
Southern Pine Association.
Southern Wood Preserving Co.

FLOORING (STEEL GRATING)
Irving Iron Works.
Kerlow Steel Flooring Co.

FLOOR SCRUBBING POWDERS.
(See Scrubbing Powders.)

FLOOR SWEEPS.
(See Brushes.)

FLUTED ROLLS.
Howard & Bullough.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

FLYERS.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

FLYER PRESSER.
Southern Spindle & Flyer Co.

FOUNDERS.
Lombard Fdry. & Mch. Wks.

FOUNTAINS—DRINKING.
Rundle-Spence Mfg. Co.

FRICTION CLUTCHES.
(See Clutches—Friction).

FULLING MACHINES.
Hunt Mch. Co., Rodney.

FUSES—ELECTRIC.
Carter Electric Co.

GARNET MACHINES.
Butterworth & Sons Co., H.W.
Proctor & Schwartz, Inc.

GARNETT ROLL GRINDERS
Roy & Sons Co., B. S.

GAS ENGINES.
(See Engines—Gas)

GAS SYSTEMS.
Kemp Mfg. Co., C. M.

GATES (FENCE.)
(See Fence.)

GAUGES—STEAM PRESSURE. ETC.
Taylor Instrument Co.

GAUGE—OIL.
Lunkenheimer Co.

GAUGES (LIQUID LEVEL.)
Lunkenheimer Co.
Taylor Instrument Co.

GAUGES—WATER.
Lunkenheimer Co.

GEARS.
Dodge Mfg. Co.
Ferguson Gear Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.

GEARS (RAWHIDE).
Ferguson Gear Co.

GEARS (BEVEL, SPIRAL, WORM.)
Ferguson Gear Co.

GEAR PULLERS.
General Electric Co.

GENERATORS—ELECTRIC.
(See Motors and Generators.)

GLASS RINGS.
Page-Madden Co., Inc.

GOVERNORS—PUMP.
General Electric Co.

GLASS—NO-GLARE COATING.
Skybryte Co.

GRAPHIC CHARTS.
Ernst & Ernst.
Loper & Co., Ralph E.

GRAPHITE.
Dixon Crucible Co., Jos.

GRATES—BOILER.
Lombard Fdy. & Mch. Co.

GRATES—MECHANICAL.
(See Stokers.)

GREASE.
(See Lubricants.)

GREASE CUPS.
(See Lubricators.)

GRINDERS AND BUFFERS—ELECTRIC.
Independent Pneumatic Tool Co.

GRINDER—CARD, CALENDER ROLL, NAPPER AND GARNET.
(See Card Grinding Machinery.)

GUARDS—ELECTRIC LAMP.
(See Electric Lamp Guards.)

GUDGEON ROLLS.
Washburn.

GUIDES—THREAD.
(See Thread Guides.)

GUMS.
(See Finishing and Sizing Materials.)

HANGERS.
(See Shafting and Hangers.)

HANK CLOCKS.
(See Counters.)

HARDWOOD FLOORINGS.
(See Flooring).

HARNESS—LOOM.
(See Loom Harness.)

HEADS—BOBBIN AND SPOOL.
(See Bobbin Heads.)

HEATING AND VENTILATING APPARATUS.
(See Ventilating Apparatus.)

HEDDLES.
Crompton & Knowles Loom Works.
Draper Corporation.
Howard Bros. Mfg. Co.
Steel Heddle Mfg. Co.
Walker Mfg. Co.

HEDDLE FRAMES.
Crompton & Knowles Loom Works.
Steel Heddle Mfg. Co.
Walker Mfg. Co.

HOISTS—CHAIN.
Chisholm-Moore Mfg. Co.
Fairbanks-Morse & Co.
Link-Belt Company.
Ryerson & Son, Inc., Jos. T.
Wright Mfg. Co.

HOISTS—ELECTRIC.
Chisholm-Moore Mfg. Co.
Fairbanks-Morse & Co.
Link Belt Co.
Ryerson & Son, Inc., Jos. T.
Wright Mfg. Co.

HOISTS—GATE.
Hunt Machine Co., Rodney.

HOPPER FEEDERS.
(See Automatic Feeders.)

HOSIERY DYEING MACHINERY.
Butterworth & Sons Co., H.W.
Franklin Process Co.
Philadelphia Drying Mchry. Co.

HOSIERY FORMS.
(See Drying Forms).

HOSIERY MACHINES.
(See Knitting Machinery).

HOSIERY YARNS.
(See Yarn Manufacturers.)

HOTELS.
Atlanta Biltmore Hotel.
Hotel Martinique.
Hotel Pennsylvania.
Hotel Sinton
Hotel Tuller.
Kenilworth Inn.

HUMIDIFYING APPARATUS.
American Moistening Co.
Carrier Eng. Corp.
Parks-Cramer Co.

HUMIDIFYING INDICATING INSTRUMENTS.
Taylor Instrument Co.

HYDROMETERS.
Taylor Instrument Co.

HYDRAULIC TURBINES.
(See Turbines—Hydraulic.)

HYDRO-ELECTRIC POWER.
Columbus Elec. & Power Co.
Georgia Railway & Power Co.
Tennessee Electric Power Co.

HYDRO EXTRACTORS.
(See Extractors.)

ILLUMINATING ENGINEERS.
Benjamin Electric Mfg Co.
Cooper Hewitt Electric Co.

INDICATING AND RECORDING INSTRUMENTS AND THERMOMETERS.
General Electric Co.
Ohmer Fare Register Co.
Root Co.
Taylor Instrument Co.
Westinghouse Elec. & Mfg. Co.

INDIGO.
(See Dyestuffs and Chemicals)

INDUSTRIAL SITES.
Atlanta Industrial Bureau.
Columbus, Ga.
Columbus Elect. & Power Co.
Nashville Industrial Corp.
Seaboard Airline Ry.
Tennessee Electric Power Co.

INK—STENCIL AND MARKING.
Bradley Mfg. Co., A. J.

INSULATING MATERIAL.
Armstrong Cork & Insulation Co.

IRON AND STEEL.
Irving Iron Works.
Ludlum Steel Co.
Ryerson & Sons, Inc., Jos. T.

IRON AND STEEL WORK—ORNAMENTAL.
Anchor Post Iron Wks.
Cyclone Fence Co.
Dufur & Co.
Irving Iron Works.
Kerlow Flooring Co.
Ludlum Steel Co.
Lombard Iron Works & Supply Co.

JACK FRAMES.
Woonsocket Mch. & Press Co.

JACKS (PUMPS.)
Fairbanks-Morse & Co.

JACK SPOOLS.
(See Spools.)

JACQUARDS.
Crompton & Knowles Loom Works.
Halton's Sons, Thomas

JACQUARD HEDDLES.
Steel Heddle Mfg. Co.

JOINT COMPOUND.
Dixon Crucible Co., Jos.

JUTE BAGGING MACHINE.
Proctor & Schwartz, Inc.

KETTLES—SIZE.
(See Size Kettles.)

KETTLES—SODA.
Lombard Iron Works & Supply Co.

KIERS.
(See Bleaching Kiers.

KNIT GOODS.
(See Cotton Cloth Commission Merchants and Dealers.)

KNIT GOODS WASHERS.
(See Washers—Cloth.)

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Hemphill Mfg. Co.
Hunt Machine Co., Rodney.
Myers Co., L. C.
Scott & Williams.
Torrington Co.
Wildman Mfg. Co.
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Barber-Colman Co.
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Taylor Instrument Co.
Veeder Mfg. Co.

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(See Belt Lacing.)

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Carter Electric Co.
Cooper Hewitt Electric Co
General Electric Co.
Westinghouse Elec. & Mfg Co.

LAMP GUARDS—KEY LOCKING.
(See Electric Lamp Guards.)

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Cooper Hewitt Electric Co.
Westinghouse Elec. & Mfg. Co.

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(See Village Architects.)

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Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

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Ryerson & Son, Inc., Jos. T.

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Fletcher Works.
Hunt Machine Co., Rodney.
Schaum & Uhlinger.
Tolhurst Machine Works.

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(See Belting.)

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Houghton & Co., E. F.
Jacobs Mfg. Co., E. H.
Neumann & Co., B.
Rhoads & Sons, J. E.
Williams & Sons, I. B.

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(See Flood Lights.)

LIGHTING ENGINEERS AND CONTRACTORS.
(See Illuminating Engineers.)

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Benjamin Electric Mfg. Co.
General Electric Co.
Westinghouse Electric & Mfg. Co.

LIGHTING PLANTS.
Fairbanks-Morse & Co.

LINEN YARNS.
(See Yarns—Linen.)

LINK BELTING.
(See Belting—Link).

LINTERS.
(See Waste Dealers.)

LIQUID CHLORINE.
(See Chlorine.)

LOADERS—WAGON AND TRUCK.
Link-Belt Company.
Morse Chain Co.

LOGWOOD EXTRACT.
(See Dyestuffs and Chemicals.)

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Saco-Lowell Shops.

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Crompton & Knowles Loom Works.
Draper Corporation.
Fletcher Works.
Hall & Sons, Robert, Bury, Ltd.
Halton's Sons, Thomas
Hopedale Mfg. Co.
Saco-Lowell Shops.
Schaum & Uhlinger.
Stafford Co.

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Hopedale Mfg. Co.

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American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Garland Mfg. Co.
Halton's Sons, Thomas
Steel Heddle Mfg. Co.
Walker Mfg. Co.

LOOP PICKERS.
Jacobs Mfg. Co. E. H.

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Dixon Crucible Co., Jos.
N. Y. & N. J. Lubricant Co.

LUBRICATORS
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.

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(See Straps—Lug.)

LUG STICKS
Allen Co.

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Carter Bloxonend Flooring Co.
Indiana Flooring Co.
Kerry & Hanson Flooring Co.
Southern Pine Association
Southern Wood Preserving Co.

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(See Guards—Machine.)

MACHINE TOOLS.
(See Tools.)

MACHINISTS.
Lombard Fdry. & Mch. Wks.

MAILING LISTS.
Ross-Gould Co.

MAPLE FLOORING.
(See Flooring).

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(See Yarns—Mercerized.)

MERCERIZERS.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Bancroft & Sons Co., Jos.
Dixie Mercerizing Co.
Elmore Co.
Southern Mercerizing Co.
Standard Coosa Thatcher Co.

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Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

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American Nickel Co.
International Nickel Co.

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Sanymetal Products Co.
Truscon Steel Co.

METAL FLOORING.
(See Flooring—Steel.)

METAL PARTITIONS.
(See Partitions.)

METALS—PERFORATED.
(See Screens and Sieves.)

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Allis-Chalmers Mfg. Co.
Carter Electric Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

METERS—COUNTINGS.
(See Counters.)

MILL BASKETS AND BOXES.
(See Boxes—Mill.)

MILL ENGINEERS.
(See Architects and Engineers.)

MILL VILLAGES.
(See Villages.)

MILL SUPPLIES—MISCELLANEOUS.
(See Supplies—Mill.)

MILL WHITE PAINT.
(See Paint.)

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International Nickel Co.

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Atlanta Brush Co.

MOTION PICTURES.
(See Theatre Equipment).

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Century Electric Co.
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General Electric Co.
Lincoln Elec. Co.
Westinghouse Elec. & Mfg. Co.

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Conn, Ltd., C. G
White Co., H. N.

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(See Card Grinders.)

NAPPING MACHINERY.
Saco-Lowell Shops.

NAPPER CLOTHING.
(See Card & Napper Clothing).

NAPPER ROLL GRINDERS.
Roy & Son Co., B. S.

NEEDLES—KNITTING.
(See Knitting Needles.)

NICKEL ALLOY METALS.
American Nickel Co.
International Nickel Co.

NURSERIES.
Howard Hickory Co.

OAK FLOORING.
(See Flooring).

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Ross-Gould Co.
Sanymetal Products Co.

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Cooks Sons, Inc., Adam.
N. Y. & N. J. Lubricant Co.

OIL ENGINES.
(See Engines—Oil.

OIL—FINISHING.
(See Finishing and Sizing Materials.)

OILS—SCOURING AND FULLING.
Houghton & Co., E. F.
Laurel Soap Mfg. Co., Inc.

OIL—SILK FINISHING.
Houghton & Co., E. F.
Laurel Soap Mfg. Co., Inc.
Philadelphia Silk Oil Co.

OIL CUPS.
(See Lubricants.)

OIL PAPER.
Bradley Mfg. Co., A. J.

OIL PUMPS.
(See Pumps—Oil)

OIL SEPARATORS.
(See Separators.)

OILING DEVICES.
(See Lubricators.)

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American Machine Co.
Howard & Bullough.
Murray Company, The.
Proctor & Schwartz, Inc.
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Woonsocket Mch. & Press Co.

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Emerson Apparatus Co.

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Hockaday Co.
Peaslee-Gaulbert Co.
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(See Contractors.)

PANEL BOARD.
(See Switchboards.)

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Bradley Mfg. Co., A. J.

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Sanymetal Products Co.
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Hunt Machine Co., Rodney.

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PERFORATED METAL.
(See Screens and Sieves.

PEROXIDES.
Roessler & Hasslacher Chemical Co.

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(See Counters.)

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Proctor & Schwartz, Inc.

PICKERS—LEATHER.
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Garland Mfg. Co.
Graton & Knight Mfg. Co.
Jacobs Mfg. Co., E. H.

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PICKER GEARS
(See Gears.)

PICKER STICKS.
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Whitin Machine Works.
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PINIONS.
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(See Culvert.)

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Cyclone Co.

POSTS—FENCE (WOOD).
Southern Wood Preserving Co.

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Georgia Railway & Power Co.
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Allis-Chalmers Mfg. Co.
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General Electric Co.
Graton & Knight Mfg. Co.
Hyatt Roller Bearing Co.
Lambeth Rope Corp.
Link-Belt Company.
Moccasin Bushing Co.
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Rhoads & Sons, J. E.
Timken Roller Bearing Co.
Westinghouse Elec. & Mfg. Co.
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(See Paints.)

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Davenport Mfg. Co.
Economy Baler Co.
Logemann Bros. Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc
Reliance Machine Works.
Textile Finishing Machinery Co., The.

PRESSURE GAUGES.
(See Gauges.)

PRESSURE REGULATORS.
(See Regulators—Pressure.)

PRINTING.
Showalter Printing Co., A. J.

PRINTING EXTRACTORS—HYDRO.
Tolhurst Machine Works.

PROCESSING.
(See Dyeing, Bleaching and Finishing.)

PROPELLER FANS.
(See Blowers.)

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Dodge Mfg. Co.
Link-Belt Company.
Morse Chain Co.

PULLEY COVERING.
Reeves Pulley Co.
Williams & Sons, I. B.

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Blackmer Pump Co.
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Toomey, Frank.
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Blackmer Pump Co.
I. X. L. Pump Mfg. Co.
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(See Valve Discs.)

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Seaboard Airline Ry.

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Walker Mfg. Co.

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Butterworth & Sons Co., H.W.

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(See Yarn—Artificial Silk.)

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(See Silk Machinery.)

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(See Fibre Products.)

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Steel Heddle Mfg. Co.
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Hunt Machine Co., Rodney.
Mossberg Corp., Frank
Saco-Lowell Shops.
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Whitin Machine Works.

REFLECTORS—LAMPS.
(See Lamp Reflectors.)

REGULATORS—LIQUID LEVEL.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

REGULATORS (BOILER FEED)
(See Boiler Feed Regulators.)

REGULATORS—(DRAFT.)
(See Draft Regulators.)

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General Electric Co.
I. X. L. Pump Mfg. Co.
Powers Regulator Co.
Taylor Instrument Co.

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(See Temperature Controllers.)

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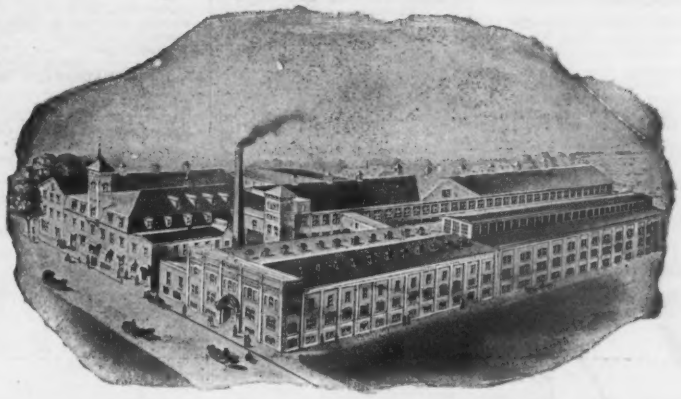

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Page-Madden Co., Inc.

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(See Knitting Machinery.)

RIB TOP CUTTERS.
Wildman Mfg. Co.

RINGS—BLEACHERY.
Page-Madden Co., Inc.

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U S Bobbin & Shuttle Co.
Wilson Bros. Bobbin Co., Ltd.

RINGS—PISTON.
Wicaco Screw & Mch. Wks. Inc.

RINGS—SPINNING.
Draper Corporation.
Howard & Bullough.
Saco-Lowell Shops
Whitin Machine Works.
Whitinsville Spinning Ring Co.

RINGS—TWISTER
Whitinsvile Spinning Ring Co.

ROCKER SHAFT BEARINGS
(See Bearings).

RODS—MONEL METAL.
International Nickel Co.

ROLL MACHINES.
Butterworth & Sons Co., H.W.

ROLLER BEARINGS.
(See Bearings.)

ROLLER CLOTH.
(See Cloth.)

ROLLER CONVEYORS.
Mathews Conveyer Co.

ROLLER LEATHER.
Bond & Co., Chas.
Neumann & Co., B.

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(See Winding Machinery).

ROLLS—CALENDER.
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Hunt Machine Co., Rodney.
Textile Finishing Mchry Co.
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ROLLS—CORK COVERED.
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ROLLS RUBBER COVERED.
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Hunt Machine Co., Rodney.
Stowe & Woodward Co.
Textile Finishing Mchy. Co.

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Hunt Machine Co., Rodney.
Southern Spindle & Flyer Co.
Textile Finishing Mchy. Co.
U S Bobbin & Shuttle Co.
Washburn.

ROLLS (WOODEN.)
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U S Bobbin & Shuttle Co.
Washburn.
Wilson Bros. Bobbin Co., Ltd.

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Ryerson & Son, Inc., Jos. T.
Southern Wood Preserving Co.

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Fiber Mfg. Co.
Glenn, J. L.
Hockaday Co.
Peaslee-Gaulbert Co.

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Allis-Chalmers Mfg. Co.
Lambeth Rope Corp.
Link-Belt Company.

ROVING—CAN.
(See Cans—Roving.)

ROVING FRAMES AND MACHINERY.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Mch. & Press Co.

ROVING CARS.
(See Trucks.)

RUBBER COVERED ROLLS.
(See Rolls—Rubber Covered.)

RUBBER SPECIALTIES (TEXTILE MILLS.)
Stowe & Woodward Co.

RUBBER STAMPS.
(See Stamps, Stencils, Etc.)

SALTS.
(See Finishing & Sizing Materials.)

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(See Engineers—Sanitary.)

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Kemp Mfg. Co., C. M.
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Vogel Co., Jos. A.

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(See Window Sash.)

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(See Boiler Feed Water Purification.)

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(See Washers—Cloth.)

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(See Floor Scrubbers.)

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Whitin Mch. Wks.

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Toomey, Frank, Inc.

SECTION BEAMS.
(See Beams.)

SELVAGE HARNESS.
(See Harness.)

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Service Recorder Co.

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Textile Finishing Mchry. Co.
Willcox & Gibbs Sewing Mch. Co.

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(See Reflectors).

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Hyatt Roller Bearing Co.
Link-Belt Company.
Morse Chain Co.

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Washburn.

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International Nickel Co.

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Cortright Metal Roofing Co.

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Southern Wood Preserving Co.

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Fairbanks-Morse & Co.
Toledo Scale Co.

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Crompton & Knowles Loom Works.
Draper Corporation.
Litchfield Shuttle Co.
U S Bobbin & Shuttle Co.
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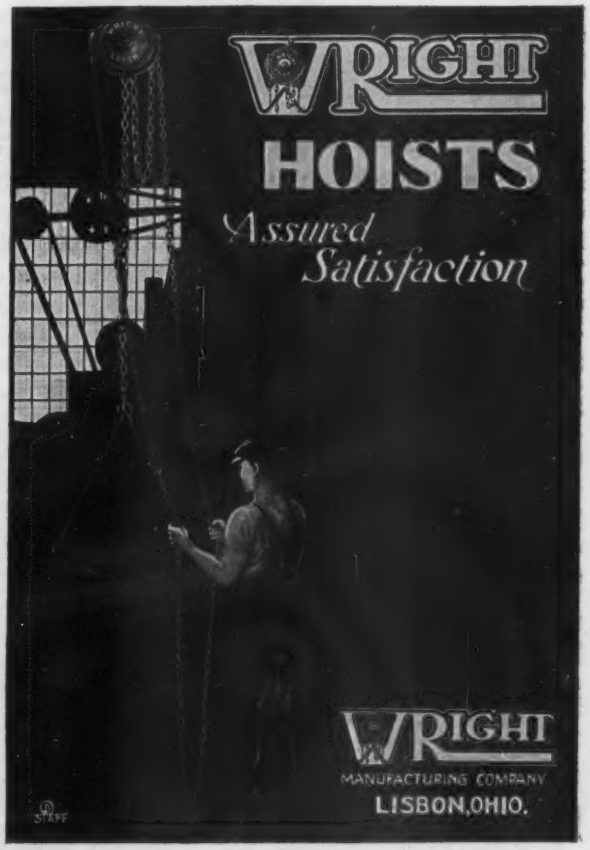

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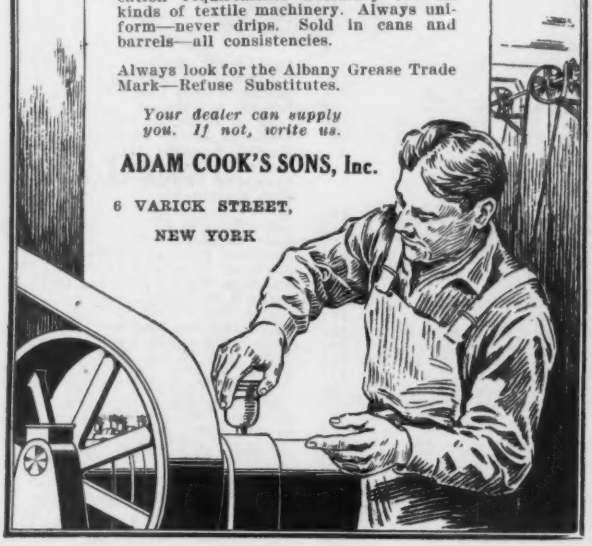

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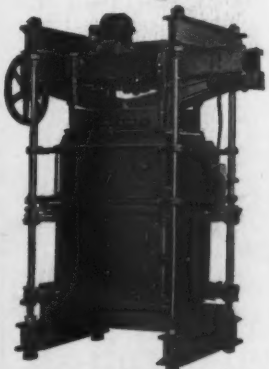

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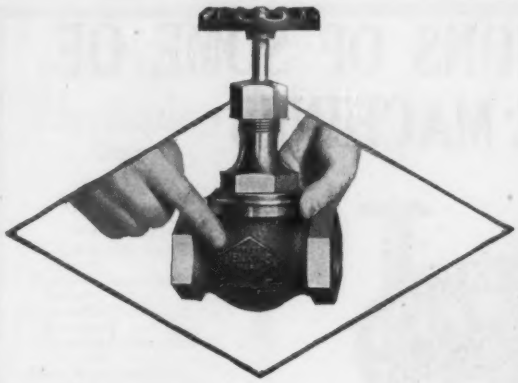

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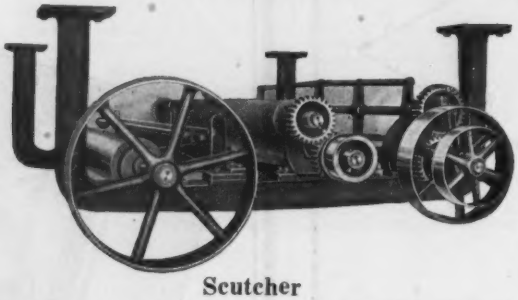

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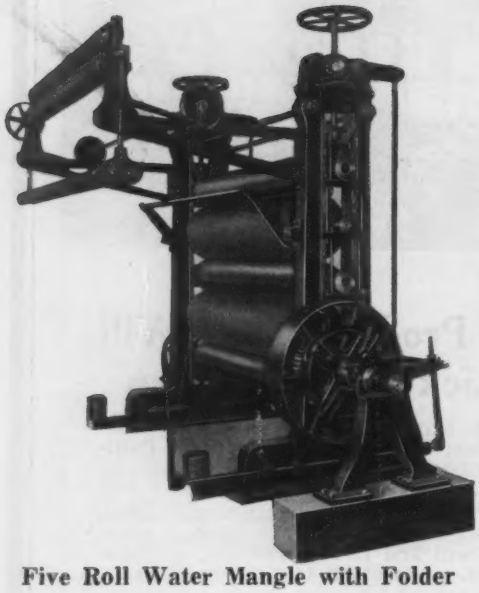

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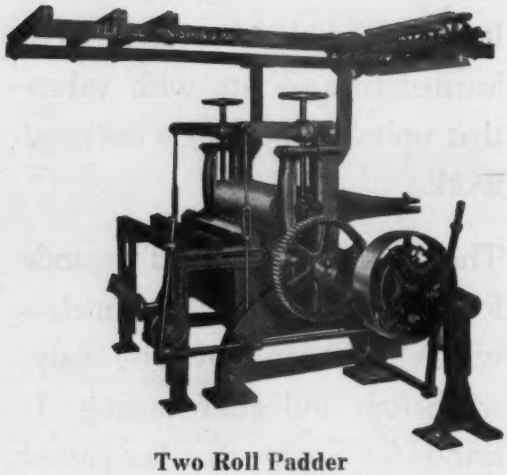

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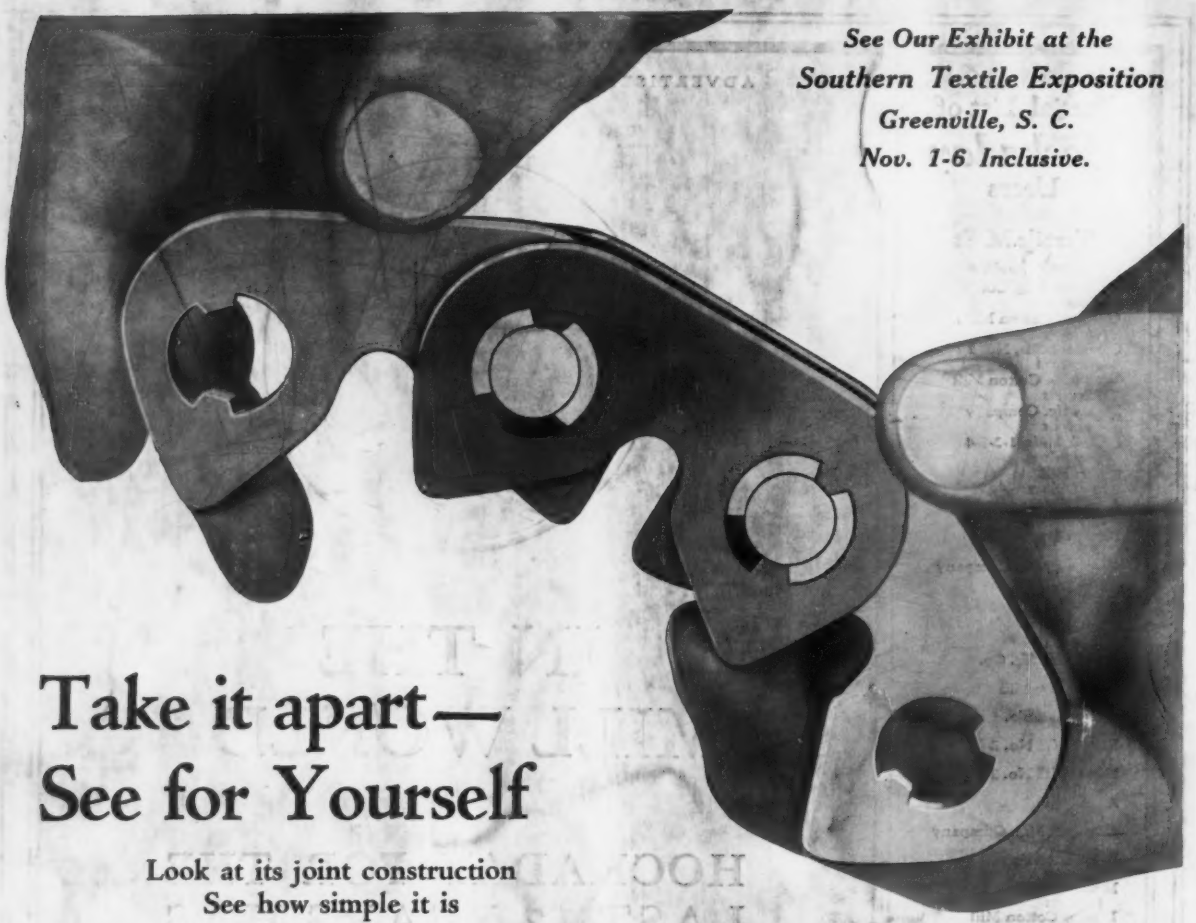

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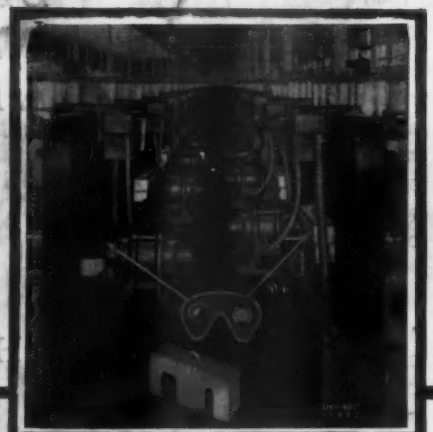

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